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Improved Revolving Horse Rake.

A perfect horse rake should be one that can be used under all circumstances, whether the ground is even or uneven, stony or smooth, and be adapted to grain where the stubble is left standing at a considerable hight, as well as to hay where the grass is closely cut. These requirements appear to be met in the rake shown in the accompanying engraving. Its simplicity of construction and ease and handiness of operation are also arguments in its favor. They would seem to leave hardly anything further to be desired. The main points of this machine can be readily described without recourse to letters of reference.

HOWARD'S PATENT HORSE RAKE.

The machine consists of an axle, on which are mounted two wheels, and which carries a frame consisting of a pair of thills connected at the rear by a platform, from which rises the driver's seat, and in front, just behind the horse, by a cross bar, to which is attached the whiffletree. From this bar to the axle is a central longitudinal bar, which serves as a base for supporting an upright and lever, used for raising the rake and its appurtenances from the ground when the rake is not in use and which is controlled by the foot of the driver. Sliding in guides attached to the thills are two uprights, connected at the top by a cross bar and sustaining at the lower end the rake head. A third upright connects with a handle, seen in the engraving as held by the driver, having a cross foot at its bottom which ordinarily holds the rake teeth to prevent them from turning. A forked spring on a horizontal bar rigidly attached to the upright handle holds the teeth down until the time for their rotation arrives.

The operation is simple. While working, the upright or hand lever is held back and the horizontal or foot lever is allowed to govern itself, as in the engraving. If the rake, being loaded, is to be rotated, the upright lever is pushed forward, which releases the teeth and they perform a half revolution, which completed, the rake is again in position and locked by the forked spring. If the rake is to be lifted so the machine can be used as a vehicle merely, as when going along the road, the foot lever is depressed and held in that position by a catch under the driver's seat. This movement raises the rake bodily from the ground. Also, if stones or stumps, or inequalities of the ground are to be avoided, the rake or only the front of it may be raised by the use of these two levers. For grain which has been cut high this machine will prove just what is needed as the rake can be held at any position desired. The woodwork can be constructed by any ordinary wood worker, and the iron work is so simple and plain as not to tax the resources of any country blacksmith.

Letters patent were granted through the Scientific American Patent Agency, July 30, 1867, to Charles Howard, Bearsville, Ulster county, New York, who may be addressed relative thereto.

Improved Suspended Lever Scale.

Practical mechanics prefer the action of the lever to that of the spring when its effects are repeatedly and frequently required, because that of the lever is always constant while that of the spring varies with its tension, which may be affected by atmospheric temperature, sudden strains, or continued use. Still, as applied to weighing apparatus for ordinary traffic the spring balance has proved very reliable. The weighing scale represented in the engraving works altogether by lever power and is sufficiently accurate under all circumstances. It is secured to a post, wall, or casing by the pivoted feet, A, by which it may be swung out of the way when not in use, and it can be held in any position by the thumb screw, B, which binds the scale to the foot, A. The lever, C, is pivoted at D, and connected by a vertical strap at its other end to an eccentric E, on a fixed stud. To this eccentric is attached the weighted pendulum, F, which carries a pointer that traverses the segmental slot having on both sides a scale, one for light and the other for heavy weights. On the size shown in the engraving any body placed on the hook, G, will show its weight in ounces and pounds, up to ten pounds, on the inner scale, while the outer, when the article to be weighed is placed upon the hook, H, denotes the weight up to fifty pounds. For the use of butchers, grocerymen, and other retailers a platform or scoop can be attached to the hooks. It is one of the best improvements in weighing apparatus for the ordinary purposes of retail trade yet presented. A patent was obtained for this scale through the Scientific American Patent Agency, July 16, 1867. It is manufactured by B. A. Drayton of Utica, N. Y., and each one is warranted to weigh correctly. Further particulars may be obtained by addressing Franklin & Read, Poland, Herkimer Co., N. Y., who will give any further information that may be desired.

FRANKLIN'S SUSPENDED LEVER SCALE.

Experimental Trial of Safety Lamps.

Some highly important experiments for the purpose of testing the relative value of the different kinds of safety lamps, when exposed to a current of air and explosive gas, lately took place at the Barnsley Gas Works, and were conducted by Mr. Hutchinson, the manager, and Mr. Wilson, steward of Darfield Main Colliery. For the purpose of the experiments a rectangular box, about 12 feet long and 11 inches by 4 inches inside, was attached to the flue of the retort-house chimney, the draft being 3-10ths of an inch, as indicated by the water gage, and by the anemometer was found to travel at the rate of five miles an hour, when regulated by a damper. Inside the box was a glass sight-hole, opposite to which the lamp to be tested was placed. When all was in readiness a stream of gas was allowed to flow into the box sufficient to surround the lamp with an explosive atmosphere. The different lamps were then tested with the following results:—The Davy lamp, with the shield on the outside, exploded in 6 seconds; and with the shield inside the gauze, gas exploded in 9 seconds. The Belgian lamp exploded in 10 seconds; the Mizard in 10 seconds; the small Clany in 7 seconds; the large Clany in 10 seconds; and the Stephenson in 75 seconds. The last is, of course, by far the best, the glass cracking before going off. It will, however, be seen that none of the so-called safety lamps can be depended on when coming in contact with a strong explosive current of fire-damp and air, but are in reality mere indicators of danger, it being clearly demonstrated that all lamps will explode the gas when the mixture is sufficiently strong.—*London Mechanics' Magazine.*

London Underground Railway.

A coroner's jury has condemned the atmosphere of the underground railway. They do not go the length of a verdict of manslaughter, but they say that the atmosphere accelerated the death of a woman named Dobner, who resided at Eton. She traveled from King's Cross to Bishop's road, and on reaching the latter station, was taken ill and died suddenly. One of the surgeons who made the *post-mortem* examination, said she was laboring under disease of the bronchial gland, and undoubtedly the suffocating air of the underground railway had accelerated death. The coroner said he had experienced the depressing effect of that railway, and therefore avoided it as much as possible. The tunnels and stations should be ventilated, but he supposed that would not be done until some shocking loss of life from suffocation had occurred.

The only underground system of railroading by which good fresh air may at all times be enjoyed is the Pneumatic plan. The cars being propelled by atmospheric pressure, it is only necessary to open a ventilating valve in the car in order to admit just the desired quantity of air, which is always pure, as there are no cinders or foul gases present. The air rushes like a hurricane through the pneumatic tunnel, always keeping the interior walls dry and sweet.

The Cuban Telegraphic Cable.

The submarine telegraph connecting the main land of the continent with the Island of Cuba has been successfully laid and is now in operation. The rates of tolls adopted by the Havana Cable Company are as follows:—To Key West, $3·50 for twenty words, $1·75 for ten, and 20 cents for every word over twenty. To England, $53·50 for twenty words: $26·75 for ten, and $2·75 for every word over twenty. To Ceylon, $81 for twenty words and $31·25 for ten. To the United States, to any part, $10 for twenty words, and $5 for ten, and 50 cents for every word over twenty.

EDITORIAL CORRESPONDENCE.

The "Prater of Vienna"—Condition of Austria—Its Mineral Wealth—Linz and its Fortifications—Scenery on the Danube—Salzbury and the Salt Mines—A Novel Visit—A Splendid Lake.

SALZBURG, Aug. 3, 1867.

Some of our Country's people, traveling in Europe, seem to be blessed with a sort of microscopic vision which enables them oftimes to behold wonders in European travel that others less highly favored, never see. The class of which I am speaking esteem it a privilege to annoy a fellow traveler by a very elaborate description of places or things which by chance he failed to see. Wishing to travel as comfortably as possible with such of my countrymen as I might fall in with, I have made it my business to see about all that is ordinarily considered worth seeing, and my experience is, that many of these wondrous objects dwindle when actually looked upon. I had sometimes heard it said that the "Prater," or great park of Vienna, was finer than the Central Park of New York, and therefore I was prepared in advance to see something very grand. The "Prater" is a large piece of land just outside the city, extending some four miles to the banks of the Danube. At the entrance there is a circular place or hub from which radiate five or six avenues, like the spokes of a wheel. One of these avenues, used as a fashionable drive, is a broad, splendid roadway, covered by umbrageous trees, and as straight as an arrow. At the end of it is a shooting box of the Emperor, around which carriages drive back again to the grand avenue. The park itself has the appearance of a very large field, destitute of engineering and ornaments, unless immense beer gardens, coffee houses, and sausage-cooking shops come under this head.

Everybody goes to the "Prater," of course, but chiefly to sip beer and coffee, eat Würste or sausages, and to listen to tolerably good bands of music that are employed to draw and entertain customers; and although I visited the "Prater" at the fashionable hour, I did not see the splendid equipages, coats of arms, fine liveries, belted Bohemian Jagers, Hungarian lacqueys, and all those things which I supposed to be common to this spot. With the exception of grand old trees, which time alone can perfect, the Central Park, of New York, is the finest in the world.

They have rather of an odd way of sprinkling the streets of Vienna. An immense hogshead is mounted upon four wheels, filled with water, and drawn by a pair of horses. To the rear end of the hogshead there is attached a leather hose provided with a common rose sprinkler. As the cart moves slowly along, a man, walking behind, shakes the sprinkler to the right and left by means of a cord attached to it. However, two men find employment at a job which, in any enterprising country, would only require one to perform it much better. In castles, palaces, fine monuments, and public buildings, vast collections of pictures, and such other things as interest the mere curiosity of travelers, and a gaping, listless multitude, Vienna is a splendid city; but so far as regards the practical arts and sciences, it is everywhere apparent that the Austrians are behind the age.

The Emperor is one of the Hapsburg House who date the commencement of their monarchial rule back six centuries to a Swiss—Rudolph Von Hapsburg. Governed by a sort of blinded religious zeal, they have never been able to win over to their system of government any one of the numerous nationalities that form a part of the Empire. The Government is understood to throw obstacles in the way of inventions, and seems never disposed to foster and encourage those elements which alone can elevate a nation and its people to true greatness. The misfortunes of last year have begun to open the eyes of the people to a realization of the fact that no nation can be truly prosperous when more than one-half of its able bodied inhabitants are soldiers, civil employés, or members of some monastic order, who have for centuries been eating into the vitals of the State, and bringing it nearly into bankruptcy and ruin. Some sovereigns seem to act as if nations were made expressly for them to govern, and the subjects a species of live stock to be transferred from one to the other as so much property.

Austria is really a fine country, and possesses capabilities of becoming one of the most prosperous. The Danube, perhaps the finest river in Europe, drains its rich valleys, and its branches extend far up to the Tyrolean Alps, which are stored with iron, lead, quicksilver, and other valuable minerals, besides an abundance of coal and salt. Nature has lavished her most bountiful treasures upon the the dominions of Austria. Its people are kind hearted, hospitable, and patient, and all they seem to need is a government to assist them in the development of their resources, which seem to lie wasting for lack of enterprise.

Leaving Vienna, we followed the windings of the Danube up to the old city of Linz, which is said to be celebrated for the beauty of its women, the fine views in its vicinity, and for its new fortifications. We saw the views, which were certainly very fine; we also visited the fortifications, and looked sharp to see the beautiful women, but saw none, and were forced to the conclusion that some guide-book publishers had been paid to introduce this feature as one of the attractions of Linz, hoping thereby to induce bachelors, at least to stop and look after them.

The fortifications of Linz differ from any others I have yet seen. They were designed by the Archduke Maximilian, and constructed at his expense. Instead of a continuous wall, with bastions at intervals, there are a series of isolated stone forts, that look like the stone barns of the Shakers—some thirty or more—which encircle the town and are connected by a covered way, forming a circuit of about nine miles, the highest eminence, called Postlingberg, being surmounted by five towers which form a citadel. These towers are all constructed with great engineering skill and are capable of holding a garrison of two hundred men. They are three stories high, the lower stories being used for storage, and powder magazines. A deep ditch surrounds every tower, so that only the upper story, or gun deck is exposed. In case of an assault, however, guns could be employed in each story, and so trained as to cover every approach. It yet remains to be seen how far this system of sunken towers is an improvement upon the ordinary method of fortifying towns, but it appears to me to combine great excellencies for the defence of these important inland towns, which are always liable to attack, whenever the balance of power requires to be readjusted—and owing to faulty construction, this balance seems always to require some tinkering.

From Linz the scenery of the Danube, many miles upward, is exceeding grand and impressive—quite equal to the Rhine, but tourists run after each other, and few, comparatively, ever think it worth while to get off the railway to make a trip on the Danube.

We spent three of our most delightful days at the old city of Salzburg, which is reputed to be the most beautiful spot in Germany. It would be difficult to find, in any mountainous district, a place that offers so many attractions to one who loves romantic drives through mountain passes and splendid scenery. The city itself is very curious, having old gateways, very narrow streets, dark passages, and old castles, one of which, founded upwards of eight hundred years ago, stands upon the summit of a rock that seems to spring from the ground, rising almost perpendicularly 420 feet above the river which rushes through the town with a tremendous velocity. During the turbulent period of the middle ages, this old rock-bound castle furnished a safe retreat for the tyrannical Archbishop who governed the country with a rod of iron. It makes one shudder to think of the awful transactions which have occurred in this castle. In one of its towers is shown the chamber of torture with the rack by which the victim was raised, and a stone weight of 150 lbs. attached to the feet; and the trap door in the floor leading to an awful dungeon below, through which the victim was hurled, and there cut to pieces. A secret under-ground stairway leads from a chamber of the palace down to the old cathedral in the city, and through which, in the sacred name of religion, Christian believers were carried to this chamber of terrible suffering and death.

The Tyrolean Alps stand immediately above Salzburg, one peak rising above the other, until they enter the region of eternal snows. It was a curious sight to me, for the first time, to look upon such a scene—the valleys below rich in the verdure of summer, while above, a few thousand feet, and nearer to the sun, the snows never melt away.

About ten miles above Salzburg, in a deep gorge of the mountains of Bavaria, are the famous salt mines, which have been worked upwards of two hundred years. Wishing to see these mines, a party was made up, and, after a carriage ride of nearly two hours up the valley of the Salza, which winds around between high mountain peaks, we reached the mines, and, without difficulty, obtained permission to enter. Ladies as well as gentlemen are permitted to enter the mines; but before doing so they must put on the breeches. The dress provided consists of trowsers, a coarse blouse, a brigand hat, and a leather apron, strapped about the waist to cover the seat. Ladies thus rigged looked comical in the extreme; but such is their praiseworthy curiosity, they cheerfully submit to the grotesque costume, and with lantern in hand, they join in the procession, and behind a trusty guide enter the main adit, which has the appearance of a receiving tomb. After traversing the adit for nearly half a mile, straight into the mountain, we ascended a flight of 450 stone steps, which brought us to a salt-water lake, forty feet deep, all beautifully lighted up. We were ferried across this gloomy Styx in a small boat, and then again entered the adit, and after a short walk we reached the pithole, where we discovered the value of our leather aprons. To enter this pit it was necessary to slide down upon two smooth bars, which resembled a ladder without rounds when placed up the sides of a building. With lantern in one hand and a leather gauntlet upon the other, to clasp a rope, the guide slides upon the bars, and the party follow his example; and thus, holding tightly upon the rope and riding pick-a-back, we went down two or three fearful descents until we reached the great salt cavern where the miners were at work. The ascent of the 450 steps, and the descent made upon the leather aprons, brought us again to one of the branch adits, on a level with the main adit, where the party were requested, without respect to sex, to get astride a car, upon which, by our own momentum, we made a rapid railway ride to the place of entrance, the whole tour occupying an hour. Within the mine there is an artificially prepared grotto or chapel, which, when lighted up, shows a most beautiful effect upon the salt crystals, which are arranged in fanciful forms. A stream of fresh water has been introduced into the mines, and the brine is carried in wooden pipes, long distances, where fuel can be obtained abundantly for its evaporation. These conduits are carried along the sides of precipices, through tunnels, or canals, cut in rocks, and over deep ravines, supported upon piles or props, in one instance, as I was informed, a distance of thirty miles. A short way above the mines is a lake called the Kings' Sea, which is most awfully grand. It lies between snow-capped mountains, which rise so precipitously above it that it is scarcely possible to gain a foothold. We were rowed through the lake in a small boat, three men and three women pulling at the oars; a pistol discharged from the boat reechos like a sharp peal of thunder. I have never before looked upon such scenery, but I am going on to Switzerland, where, I suppose, things are done on a grander scale.

S. H. W.

Special Correspondence of the Scientific American.

VARIOUS NOVELTIES IN THE EXPOSITION.

PARIS, August 6, 1867.

The second trial of mowers and reapers, which I mentioned in my account of the first was to be held, has after several postponements, at last taken place. The ground mowed was exactly the same as that appropriated two months ago, the grass having in the mean time grown to a sufficient hight, but a less area was apportioned to each machine. Nearly or quite as many machines took part in the competition as on the previous occasion, and the results were equally favorable for American inventions. The area to be mowed by each machine was one acre. Wood's machine was again first in completing its work, but escaped only by an accident being robbed of its laurels by the Perry mower. The latter had cut all its plot except about thirty seconds work in its last swarth when by some means or other it broke its cutter bar, causing a delay of ten minutes to replace it. Notwithstanding this accident it came in second only, the actual working time being but about twenty-six minutes, and the quality of work done first rate. This machine has received some modifications since the last trial, but perhaps owes some portion of its success to the skillful manner in which it was handled. Wood occupied thirty-three minutes in cutting his field, thus very well sustaining his previous position. McCormick's machine also did well, but Howard's was less fortunate than before, meeting with some serious mishaps and doing its work badly. On the whole, therefore, the relative standing of the best machines was not much changed by this trial, except in the increased efficiency of the Perry mower.

A characteristic American invention is that of separate teeth for circular saws, several forms of which are exhibited, made under Emerson's and Miller's patents. It would be difficult to conceive of an innovation of that class originating in England, though having once seen it they will be quick to appreciate its value. There appears to be no one to give any information in reference to these saws, though there are many who would be glad to hear about their practical operation.

The electric light on the top of the ugly frame work in the English portion of the grounds is now working well, giving a magnificent light. The electricity is derived from a pair of magneto-electric machines running at 400 revolutions per minute, and the apparatus is in motion for several hours during the day, and from 9 to 10 o'clock in the evening, competing at that time with the French oil light. One should properly be several miles away to judge correctly of their relative powers.

Some very fine Fresnel lenses are exhibited by Messrs. Chance, of Birmingham, makers to the Trinity board. They have received a prize medal, and astonished the public a short time since, in proving them, in a photometric trial, nearly ten per cent superior to the French lenses, which have long held the first rank. Their efficiency is attributed to excellence of workmanship, as the quality of the glass does not appear equal to the French, and is said not to be so good as that usually turned out by this firm, owing to some difficulties with their furnaces at the time this was made.

One of the most interesting portions of the Exposition is that of railway carriages, particularly in the French department. We have been accustomed to think our system of long cars with four-wheel swiveling bogies at each end, the best possible for ease of working and economy of repairs to the permanent way. But whatever it may have been in time past, I think it is evident that our railway companies are beginning to find that there has been a growth in the wrong direction, and while builders and patentees have labored to produce the most luxurious accommodation for the public—and let us give them all praise for having done so—they have lost sight of the requirements of the railway in increasing the weight beyond measure, so that our heavy sleeping cars have become almost as destructive of permanent way as locomotives. To reduce the weight per axle, they have in some cases resorted to the use of sixteen wheels, but as these bogies are themselves the heaviest part of the structure, this shift involves a considerable addition to the total weight. A study of the European carriages exhibited, gives reason to believe that after all the system in vogue here, of short vehicles resting on two single axles with no heavy truck frames, but simply a light wrought-iron jaw to receive the axle box, is the true one. Counting up the number of passengers which these carriages will contain and taking the weight of the structure, we find that the dead weight per person is decidedly less than with us. A new feature which has been introduced within the past year or two on some of the railways of France, viz., the addition of a second story to the carriages, for second and third class passengers, has still further reduced the proportion existing between dead and paying weight, and really makes our figures seem quite extravagant. The use of iron framing is another of the means by which the weight is reduced, and despite of all the objections, such as noise, rigidity, etc., that have been raised against the substitution of iron for wood in this case, the use of iron frames is becoming continually more extended and appears perfectly satisfactory. With a view of removing the jarring which has sometimes been complained of with this mode of construction, some of the carriage bodies exhibited are not placed directly on the frame girders, but are supported by cast-iron brackets bolted to the sides of the latter, and having disks of india rubber on their top surface, to act as a cushion and prevent the transmission of vibration from the wheels. This matter of light carriages is one that deserves careful attention from our railway men, for it is evident that the present system is far too expensive both in first cost and in maintenance. The hight of the two-story carriages is not much greater, if any, than that of our "monitor" cars, and as the upper story is not carried quite the full width, the

center of gravity is maintained well within the base. Great numbers of them are now in use here, and it is certain that their adoption will be extended.

While noticing the railway carriages we must not pass over the carriage which is exhibited as one of those intended for the temporary Mont Cenis Railway. As several years must elapse before the completion of the great tunnel which is to establish railway communication between France and Italy, a railway is in course of construction to ascend the mountain itself by a route similar to that now followed by the diligence, working at gradients much steeper than those generally allowed in railways. To render this possible a double-headed rail is laid on its side between the two ordinary ones, and supported so that a set of horizontal wheels on the locomotive can be made to grip this rail and thereby obtain an adhesion independent of the gravity of the engine. The carriage is also provided with two pairs of wheels bearing against this middle rail, but apparently not intended to do much work, as they are not provided with axle boxes. A brake is arranged to seize this rail, beside others applied to the carrying wheels in the usual manner. The seats inside are arranged along each side as in an ordinary omnibus, the gage of the road being considerably less than the standard width, but are comfortably cushioned as in ordinary first-class carriages. The whole is of course arranged with chief regard to lightness, and it is probable that for its purpose the railway will be very successful.

There are quite a variety of devices for establishing communication between the guard of the train and the passengers, exhibited, and some of them are in use on the French railways. They always involve a galvanic battery or some other system of machinery which to Americans seem absolutely elaborate and unnecessary. Europeans think that with their system of close compartments passengers could not be trusted with the simple bell cord as we have it, but they might at least give it a trial, and perhaps they would find their fears groundless, while they would certainly save themselves much expense. But it is contrary to French principles to trust the public, and expense is preferred to such a breach of principle. SLADE.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

The Chicago Artesian Wells--A Question in Hydraulics.

MESSRS. EDITORS:—On Saturday, August. 17th, the Mayor, Common Council, and Board of Public Works of Chicago visited the artesian wells, for the purpose of testing the head of water, quantity discharged, etc., in order to ascertain whether it would be practicable to apply the water to city uses. There are two wells, one 5 inches in diameter at the surface, contracted to 4½ inches at the bottom; this well is 711 feet in depth. The other is full 5 inches from the surface to the bottom; in this latter well is inserted a cast-iron pipe 64 feet in length, which penetrates the rock 42 feet and projects above the surface 22 feet. This pipe is 5¼ inches in diameter and is cemented in and fits the well perfectly tight. From the top of this pipe the water is discharged upon and drives an overshot wheel twenty feet in diameter, used as a power for drilling and enlarging the other well.

In order to test the head of the water, the first well was stopped or plugged forty feet down with an ordinary leather sand bag, so that no water came from this well at the time of the test. Now a cap was fitted on the top of the cast-iron pipe, and a common gas or water pipe 1¼ inches in diameter was inserted in this cap, and carried up until a hight of 45 feet above the surface, and 87 feet above the level of the lake was reached. The water overflowed above the top of the pipe 18 inches in the air, when the fact was exhibited and it was readily seen that the water would rise much higher in the opinion of the City Engineer, as much as forty or fifty feet. The plug in the cast-iron pipe at the level of the top of the wheel was removed, and the water discharged at that point. It was estimated to flow here 300 gallons per minute, or 432,000 gallons per day. Then the plug at the surface was removed, and the water discharged there. This was accurately measured, and found to be 345 gallons per minute, or 496,000 per day. The water at both elevations discharges with great force and power, and we estimate its resisting force in either well at from 600 to 800 pounds, though this fact has never been accurately determined. Now we find that upon closing both of the lower orifices, the one at the surface and the other at the wheel, the water rises to and overflows the top of the pipe only three or four inches, and does not reach its full head of eighteen inches until after the lapse of from twelve to fifteen hours, and during this time it seems, as it were, to creep up by degrees, growing stronger and stronger the longer it is left undisturbed. Now the question is, why does not this water rise at once, and as soon as the lower orifices are closed, to its full head or fountain level? The natural supposition is that it would rise and discharge in less than five seconds, but it does not. At the lower orifices there is not, and has not been for nearly three years, any perceptible diminution or variation in the flow of water, but it comes all the time with the same force and power. Seasons, wet or dry, make no difference. There is no change in the temperature and no change in the quantity.

I can illustrate this by referring to the fountain in the City Hall Park, New York. Suppose the head of this fountain is seventy feet; now screw on a two-inch pipe, say fifty in hight. The water would spout out of this pipe perhaps ten feet in the air. Shut the water off and turn it on again, the discharge would be the same, and the time but momentary. Now, while the discharge from our pipe in the air is fully eighteen inches, yet we cannot obtain that amount except by waiting a given length of time. Can you, Mr. Editor, or any of your readers, solve this question for me?

GEO. A. SHUFELDT, JR.

Chicago, Ill.

Long Range Guns. Vacuum before the Shot.

MESSRS. EDITORS.—The closing paragraph in a communication from E. H. Pardee, in your paper of Aug. 3d, requires a notice from me. It is in regard to firing projectiles *in vacuo*, or from a barrel exhausted of air.

This idea originated with me several years ago, and in 1852 I addressed you a private communication on the subject requesting an opinion. Your reply, in "answers to correspondents," in your paper, will show it, even if the original letter be not preserved. The rapid retardation of shot by the atmosphere has been long well understood, but the powerful effect of this resistance on the shot, before it emerges from the barrel, has not been sufficiently well considered. One would hardly suspect, unless he had made the calculation, that, in the thirty-two pounder, the resistance is more than four hundred and fifty pounds. And this is far more difficult to surmount than that offered by the inertia of a solid body of that weight. Because, the latter is susceptible of accelerated velocity, and of increasing force, while the other, being due to elasticity and not to weight, is incapable of absorbing force. Thus in the case of atmospheric resistance, when the charge shall have traversed half the length of the chamber, it is still wholly inert. It has acquired no inherent volocity, no independent force, and offers quite as much opposition to the driving power, at that point, as at the start. Now, when it is considered that this resistance, to some extent, increases, while the propelling power decreases with tremendous rapidity, it will be seen, that a point is very soon reached, where acceleration ceases, and, beyond which, any additional length of barrel tends to diminish the force of projectiles.

It has been estimated that powder, transformed to gas, expands to two thousand times its bulk, and, that this expansion takes place, *in vacuo*, with a velocity of five thousand feet per second. If this be so, then, a charge of powder occupying one linear foot, in an exhausted chamber two thousand feet long, would fill it, less the amount of explosion due to the quantity of heat absorbed by the barrel; and it would fill it in two fifths of a second. It is evident, also, that a shot placed before this charge, would soon acquire its maximum velocity, and plunge into the external air with terrific force, but at what point acceleration would cease, could be determined only by experiment. In a gun of six inches caliber, perhaps fifty feet might be necessary, and, if so much, it would limit the practical application of this principle, for pieces of so great length, could be used only on fortifications or in sieges, and, possibly also, on large steam ships. Such pieces would have to be made in sections, screwed or bolted together; but the sections could be made extremely light without danger, provided the breech section was of usual strength.

To produce the requisite vacuum at the proper moment, would require the aid of steam, applied as in the Gifford Injector. Let the muzzle of the gun be gently tapered almost to an edge, and surrounded by a second muzzle or rim, extending back ten or twelve inches, with a roomy cavity between, but narrowed down at the point, so that a thin cylindrical sheet of steam would jet forward from it around the bore. A pipe running from this cavity along the barrel to a point central between the trunnions, and these connecting with one from the boiler, would admit the steam, which could be turned on the instant before firing. It would at once almost perfectly exhaust the chamber and relieve the shot, as it advanced, of all opposing pressure.

I am not certain about it, but I think that in my communication, above alluded to, I suggested, in connection with this principle, the idea of accelerating charges, located in recesses along the barrel of the gun. This idea was original with me at the time, but has also been suggested by others. I have seen it, either in the SCIENTIFIC AMERICAN, or elsewhere long before the description of Lyman's Accelerator appeared. Nor, have I any doubt, that it was original with that gentleman also, who deserves all the merit of it for having first practically applied it.

But, I had concluded, that this thing of acceleration, could be accomplished in another way, much more simple and quite as effectual, by a re-enforcing cartridge, used in the ordinary guns. I think it practicable to make a cartridge, with partitions, each partition containing a full charge of powder and so divided, that when fired from the front, they will explode in succession, thus affording all the advantages of accelerating charges placed in receses along the chamber.

This cartridge, fired *in vacuo* with sufficient length of barrel, would bring us at one step, to the utmost limit of improvement in the range of projectiles by giving an initial velocity equal to that with which the gasses of powder rush through a vacuum.

Such a projectile, moving with such velocity, like some headlong body, falling from the empty regions of space, into our dense atmosphere, with the heat evolved by its violent compression, added to the high temperature acquired, in so long a barrel, by contact with the burning gases, might become incandescent and flash through the air, like some gleaming meteor, thundering on its way.

These speculations unsustained by any practical proof, will have to be taken for what they are worth, as mere fancies, until some one, with ampler means than I, shall test their value by a course of well directed experiments.

H. S. WHITFIELD.

Tuscaloosa, Ala.

The Shipment of Crude Petroleum.

MESSRS. EDITORS:—I have read the article in your valuable journal of Aug. 17 issue, in relation to the sad and fatal accident which happened to the ship *Meteor*, on board of which was stowed upward of two thousand barrels of crude petroleum bound for London. The fearful nature of the accident, which in one minute rendered the noble ship a burning wreck, killing by the explosion of the vapors, one half the crew, and destroying thousands of dollars worth of valuable property, calls for more than a passing remark from the journals of the day. I am gratified and personally thankful that you have so ably criticized the practise of shipping, so inflammable an article as crude petroleum at all, and putting it in the poorest class of barrels, often very leaky and imperfect, always selecting the best glued packages for the finished illuminating oil, which latter article is not dangerous to life or property, owing to the volatile naptha being removed by distilation from it. I have had for the last twelve years much experience in the manufacture of coal and petroleum oils, having had the entire charge of the Downer Kerosene Oil Works from their earliest commencement, and oil, either crude or refined, with the naptha honestly removed from it, is as safe as most articles of commerce in the line of oils. All that is necessary is to distill off the naptha, which is easily and cheaply accomplished, and the last of such frightful accidents as the loss of the *Meteor* would be recorded. Naptha, however, is very largely consumed in Europe for many uses in the arts, such as varnish-making, painting, carbureting gas, etc. If it is all removed from the crude oil, it must be shipped either in tin or metalic vessels, at a large cost for packages, or some suitable vessel must be employed that is, and will remain, perfectly tight, allowing no escape of naptha or gas from it to pervade the vessel. Ordinary barrels do not hold the naptha, the leakage being often from ten to twenty per cent. of the entire cargo; but I do claim that the new tongued and grooved and cemented joint barrel, as illustrated in your paper of July 20, 1867, will carry without leakage, to any European port, the most volatile naphtha, as well as either crude or refined petroleum. The company I represent have shipped largely to Europe, and also to tropical climates, oils and whole cargoes of naphthas without a particle of loss, and when the means of transportation of these valuable products of our country, is within the reach of every shipper of oil, it seems to me the careful merchant and refiner will avail themselves of it and by the use of this improved package render the transportation and storage of these products safe and profitable. You are in error when you state there is no use for naphtha either in New York or Europe, and that it is only of value at the wells where it is produced, as several hundred thousands of barrels of naphtha are consumed per year in this country and Europe; our company, alone, make and sell yearly at least $400,000 worth of naptha.

JOSHUA MERRILL.

Boston, Mass.

Acceleration of Shot.

MESSRS. EDITORS.—Having seen an interesting account of Lyman's Accelerating Cannon in your valuable journal, I thought my experiment to increase the velocity of shot for fowling might be interesting. I first constructed a tube to communicate fire to the center of the charge of powder; this sudden expansion bruised the shot in overcoming their inertia. This objection led to a mode of putting the shot in motion before the powder was all burned. I constructed a long narrow chamber in the breach of the gun and communicated fire to the top, or end next the shot. This had the desired effect; the shot were put in motion before any considerable quantity of the powder was burned and were followed up by the powder burning back, increasing their velocity, and I could use double the quantity of powder with ease and safety and with greatly increased effect. If the length and diameter of the chamber were proportioned to the required capacity of a cannon, I think it would be preferable to having the powder in chambers, along the bore of the gun. SETH BOYDEN.

Newark, N. J.

Screeching of Steam Whistles.

MESSRS. EDITORS.—A steam whistle can be varied in tone by raising or lowering the bell on the standard supporting it, the same being provided with a thread and jam nut for that purpose, but different notes, or discords, are often made by whistles without changing the position of the bells; in other words they screech. This is caused by the vibrations occurring in unequal times so that the waves interfere with one another. The inequality in the vibration is occasioned by suddenly opening the valve so as to start the edges of the bell before the mass has time to respond, by water upon it, and by disproportion in the bell itself. Some whistles are never satisfactory in their operation. These hints may lead to a remedy. E. P. WATSON.

New York city.

The Willow and the Levees.

MESSRS. EDITORS.—Your correspondent, G. W. R. B., in your issue of Aug. 17, labors under an erroneous impression in regard to the willow. No tree is more tenacious of life in any soil, wet or dry. Of its applicability to strengthening the Mississippi levees there is no reasonable ground for doubt. A line of willow posts or stakes thrust not less than three feet into any soil, will take root and grow vigorously. The only object should be to put them to such a depth that the bottom may be constantly moist. They may be set upright, or take the direction of any embankment with one end below the water line and the other at the top of the

levee, being careful to cover with earth to the point intended to grow. In a few months they will become as fixed as roots can make them. The white, or osier willow, should be used as it cannot be broken off by passing timber or by any other ordinary means. I have never seen the Mississippi, and know little of the manner of forming the levees, but I suppose them to be simply an embankment, parallel with the river. With this form in mind I will say that were the duty of preserving this embankment to devolve upon myself, I would insert three lines of willows—one on the water side at the base and sloping with the bank to a point near the top—another along the center of the top, and the other about half way down the embankment upon the land side, the last two to be inserted perpendicularly, to the depth of not less than three feet. In a few years these willows would send a net work of roots through every part of the embankment sufficient to resist the wear of any amount of water, and be far more durable than any piling of timber. While on this subject I will say a word in regard to the size of material to be used. The object desired is roots. Now these may as well be obtained from a twig the size of a rake handle, and even smaller, as from a stick of timber a foot in diameter. When once rooted they are safe, and sure to grow from five to fifteen feet in length the second year. They should be set in rows, say two feet apart in the row, and pretty soon the Mississippi will be hedged in with a living fence that may endure for centuries to come T. F. C. H.

Lawrence, Mass.

There can be no doubt of the strengthening influences of the willow when planted on the slopes of river embankments. Whether there may be peculiar influences in the Mississippi to neutralize this benefit we do not know. But the embankments built by Col. Colt at Hartford, Conn., by which he redeemed hundreds of acres from overflow and procured a site for his extensive works and for two villages, are protected by means of osiers thickly planted on both the land and river slopes. These send their roots for a number of feet into the bank and furnish a valuable crop of superior basket twigs, the manufacture of which into articles of use or ornament gives employment to several hundred hands.—EDS.

TECHNICAL WRITING IN THE DAILY PRESS.

It is quite safe to assert that there is but one thing that is likely to cause a writer to commit great errors in writing on a subject he does not understand, and that is, to be inspired by those who supply him with erroneous information either through ignorance or design, or both. The writers on the daily press are for the most part accomplished and scholarly men and treat scientific subjects with judgment when they take the trouble to read up; an important item which we are sorry to say, is but too frequently neglected.

The case in point is the report of the Special Correspondent of the N. Y. *Times* on the voyage of the French iron-clad *Dunderberg* from New York to Cherbourg, and it is to be hoped that a few words spent in pointing out some of his errors may not be thrown away. Hence no apology is necessary for what follows.

The writer on the *Dunderberg* says "our ponderous engines (the largest that have ever been made in the United States) driving us through the water at a speed of 8½ knots,"—as there are no less than eight pairs of screw engines already built in this country, each larger than the *Dunderberg's*, the nonsense of this opinion is apparent. His directions for the treatment of a new engine are too unique to be omitted. "A new engine must be as carefully watched as a new babe .... each of its many members must gradually feel the strain. Here a little bracing is necessary, and there the tension (of the diaper pin?) must be relaxed. In this manner the various parts are at last brought into nice adjustment and perform their functions "harmoniously." The simplicity of that description is worthy of Homer or Walt Whitman!

In order to exhibit the tempestous (?) character of the voyage old Neptune is agitated, "thusly"—"In all my experience however I never knew anything to approach the *Dunderberg* in the quiet dignity of her behavior in a high sea." ... "It was not necessary at any time to put racks on the dining table, our crockery and glass ware keeping in position as securely as if we were on dry land."

The immense force of the huge waves is further shown as follows: "It was only when the sea was running high (?) that it washed over this low part of the vessel." This low part is the deck abaft the casemate and is but a little higher out of water than the monitors' decks; those who made the voyage in the *Miantonomah* will understand the hight of the sea necessary to wash over such a deck!

"I do not," he says," intend to convey the impression that the seas did not break over the main deck at all. On the contrary, they did *at times* curl over in considerable volume, making it necessary to batten down the hatches (over the officers' quarters) and vitiating to some extent the air in the wardroom below, but not to a degree that was *remarkably* uncomfortable." Query? How about ventilation, if they had encountered a gale when it would have been necessary to keep these hatches battened down? A little further on this marine observes: "Her superior ventilation," etc., "are all matters of record!" And, again, the weather was so fine that, as he justly remarks, "It was simply a prolonged excursion at sea, where no drawbacks to comfort existed except the single one—the absence of ladies."

Respecting models our marine architect thus discourses: "It cannot be long before the principles which have governed the construction of the *Dunderberg*, making her so easy and comfortable, are applied to ships generally. Such vessels, being relieved of the jacket of 1,000 tuns of iron, which encases the experimental ships, may indeed place sea sickness, and the minor discomforts at present inseparable from a voyage, in the catalogue of the things that are past." The readers of the SCIENTIFIC AMERICAN are, doubtless, aware that the cross sections of this vessel are almost precisely like those of a scow, the bottom being dead flat and the bilges nearly square—no curved futtocks are used, the side frames being joined to the floors like the gable of the ship-house in the navy-yard. A rudimentary acquaintance with the mechanics and hydro-dynamics of naval architecture is sufficient to point out to any one familiar with them that not only is such a construction about the worst possible for strength, but also for ease of motion in a sea-way. The latter for reasons which will be found demonstrated geometrically, practically, and mathematically, in any standard treatise on naval architecture. And if the object sought is to make such an immersed form positively unfit for ocean navigation, it can readily be attained by lowering the center of gravity of the ship; in the present case, this would be accomplished by "relieving" her, as this writer suggests, "of the jacket of 1,000 tuns of iron," which alone renders her motions tolerably easy; the log states the rolling was "deep and quick," but without "jerk.' Now, to produce as pretty a "jerk" as ever frightened the captain of an improperly stowed ship by seeing his masts cracking like whipstalks, it is only necessary to remove the armor. It would simply be another demonstration of the laws that must be regarded in relation to the form and disposition of weight necessary in order to have a vessel intended to navigate the ocean, properly balanced.

The injury to the national cause during the rebellion by the delay in the completion of "The Union-saving Ram," is thus alluded to by this naval critic:—

"Very few persons have forgotten the high hopes which were entertained during the dark days of 1863–4, when the rebels were receiving aid from England by way of Charleston and Wilmington, of the effective service which this mysterious engine of naval warfare was to render the cause of the Union, by the reduction of the forts which guarded the approaches to the harbors of the enemy. "Happily the war was ended before the formidable powers of the vessel could be tested." The idea of this "mysterious engine" reducing the forts in Charleston harbor and Fort Fisher, is decidedly rich under any circumstances, but it becomes richer still when it is borne in mind that her great draft of water (over twenty feet) would prevent her from approaching within anything like gunshot of the one, or within effective range of the other. The *New Ironsides*, with between fifteen and sixteen feet draft, had to be handled with the utmost skill to keep her from grounding while on service before Charleston. "While she was in progress of construction," so states this correspondent, "Mr. Webb was directed to enlarge the hull and engines to a size considerably larger than was at first proposed," and then, that his application to the Secretary of the Navy "for increased compensation was unsuccessful." Now this may be so, but it does not seem at all likely that the Government first ordered the vessel to be enlarged, and then refused payment for the additional cost, because it "would be compelled to modify the contracts between the Government and the builders of other iron-clads!"

Of course the question of armor and invulnerability receives more than a passing notice; the following extracts will suffice: "It is asserted in some quarters that the *Dunderberg's* good points are more than counterbalanced by the single fact that her armor is not as heavy as recent inventions in gunnery have proved that it ought to be to render her invulnerable. . . . I do not concede the justness or soundness of the objection." This refusal to "concede" to the "soundness of the objection" that projectiles from ordinary naval guns can riddle the armor of this vessel will no doubt cause those "foolish virgins" to pause and reflect, who put on iron to keep them out! But our vulnerable friend complicates his position by stating that "invulnerability is an excellent quality, and in a purely defensive warfare is doubtless the most valuable to possess. But in aggressive warfare there must be other qualities quite as essential." In other words, in "defensive warfare," as he terms it, the cuirass must be strong enough to keep out the enemy's missiles, but in "aggressive warfare" this is not important. No doubt a definition of these terms would be welcome to most of our readers, but what he really means it is impossible to say. In other words victory is important in one sort of warfare but not in the other! It is usually held that the duty of armor is to keep out shot and shells; if like the *Dunderberg's* as is admitted, it will do neither, what useful purpose does it fulfil as armor?

The "aggressive" qualities of the *Dunderberg* are thus set forth: "Speed and the ability to carry a heavy armament are as necessary as impervious armor," as she is utterly deficient in the latter, it is asserted that the former 'essentials obtain in the *Dunderberg* to a degree which is approached by no other iron-clad in existence. I say this in full knowledge that it cannot truthfully be contradicted."

This is what may be termed "doing the thing up Brown." As for speed, it is known that the *Dunderberg* is excelled by all the first-class iron-clads in either the French or English navies, and this opinion, founded originally on the result of the measured mile trial, receives a marked corroboration from the log of her Atlantic voyage. According to the log 82 tuns of coal per day were consumed, and the average speed was only 9 knots per hour; hence, as the consumption of coal increases as the cube of the speed, it will be seen that in order to maintain a speed of 13 knots, some 250 tuns per day must be used, and for a speed of 15 knots, no less than 378 tuns. Of course neither of these enormous amounts can be burned, and the wonderful speed claimed for this absurd shape is seen to be moonshine. This again suggests the subject of models, and a comparison will show that the orthodox forms were not designed by tyros or foolishly adhered to by the most successful constructors. The *Warrior* is a ship of about 3,000 tuns more displacement than the *Dunderberg*, and with a clean bottom can always be driven—as abundant trials prove—14½ knots in smooth water, and she is driven by a set of boilers of one third less area of grate and capacity than those of the *Dunderberg*. This shows how much easier the *Warrior*, with her regularly curved bottom, can be driven than the *Dunderberg* with her scow-formed bottom and straight sides.

The *Dunderberg's* machinery can doubtless develop as much power as that of the *Warrior*, and with the same economy of fuel. The *Dunderberg's* burning 82 tuns per day, or 7,649 pounds per hour, indicates some 2,200 horse-power, and as the speed increases as cube of power, it will be observed that to propel her during the voyage, 13 knots (according to the figures of the log), nearly 7,000 horse-power would be registered. The *Warrior*, deep loaded, runs 14½ knots with 5,500 horse-power.

Those interested in models will now have some idea of the power necessary to achieve high speed with the scow form, after making proper allowance for the conditions.

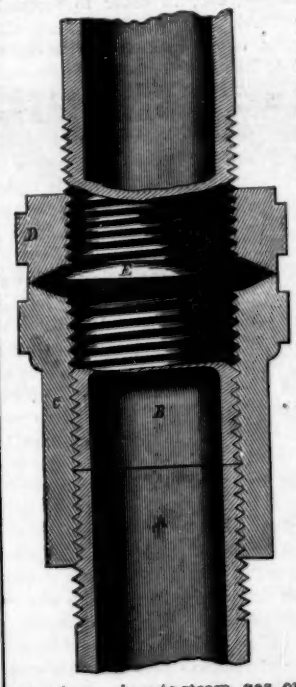
The following comparison it is not likely will be recognized by those who have had a look at the French ram: "The *Dunderberg* was floating like a swan, the outlines of the hull conforming more nearly to the shape of that bird than to any thing else." It is suggested that as she may be more formidable than she looks, a "singed cat" would be more appropriate as a comparison.

With regard to the ability of this vessel to carry a heavier armament than any iron-clad afloat, it is enough to say that there is not a large iron-clad in either the English or French navies but what can carry at least as heavy, and most of them a heavier, battery. The fact is that the gun deck of the *Dunderberg* is much too weak for the manipulation of twenty-tun ordnance. It is unnecessary to say that the same gun carriages on any other ship will work as well, and better with a deck of proper strength.

The following passages from hence to Europe made while the *Dunderberg* was at sea, will give to those familiar with North Atlantic navigation a pretty good idea of the character of the weather she was so fortunate as to enjoy. The *Scotia* left New York at noon, July 24th, arrived at Queenstown at noon, Aug. 2d. *City of Baltimore*, from New York to Liverpool, passage inside of ten days. *St. Laurent*, Brest July 20th, arrived at New York at noon, July 31st. *China*, Queenstown *via* Halifax, July 20th, arrived at Boston July 30th. ***

YOUNG'S PACKED PIPE JOINT.

The connection of metal pipes for steam, gas and water under pressure is always more or less difficult. It is seldom that the threads, either on the pipe or the couplings, fit so accurately as not to leak, and it is somewhat difficult to pack the parts so they shall be entirely tight under all circumstances. Of course, some method of packing these joints is desirable. One is shown in the engraving. A and B, represent two pieces of pipe joined together; C is the fitting or socket covering the joint between the pipes; D, is the lock nut, all shown in section. The approaching ends of the socket and nut are turned concave, and in the cavity thus formed, packing, designated by the letter, E, of some elastic substance or of soft metal, is introduced, and by the inclining sides of the cavity is forced firmly against the threads of the pipe and of the nuts. The result is a perfect joint, impervious to steam, gas, or water.



The patent is dated July 16, 1867, Wm. Young patentee, who may be addressed at Easton, Pa.

Grand Industrial Exhibition.

A workingman's fair on a large scale is to be held in this city next spring, the exhibitors being journeymen mechanics only. The projectors of this enterprise claim that hitherto all the industrial exhibitions held in this country have been under the control of parties having but little interest in the laboring classes, and as the products of labor exhibited by them were the property of capitalists, the honors and profits went to the credit of proprietors rather than the workmen. The fair next spring is to reverse this order of things, in the manner above mentioned. A circular has been issued to the journeymen mechanics of the United States inviting their co-operation in this movement.

BREECH LOADING ARMS.—The board appointed by this State for examining breech-loading fire arms, re assemble on September 17th. Patentees and exhibitors of guns of this class, desirous of presenting the merits of their respective weapons, will have an opportunity on that, or the four succeeding days, of testing their guns in accordance with the regulations adopted.

Steam Fire Engines.

Although hand engines for extinguishing fires are still largely employed in this country, the cities and large towns have very generally adopted the much more effective steamer, with its muscles of iron and steel, which never tire. Our engraving is a very accurate representation of a first class steamer on its way to a fire, and will give a correct idea of these powerful machines to our country and foreign readers, who may never have seen one. But the sheen and glow of the polished steel, iron, and brass, and the volumes of rolling smoke, the rapid rush of the horses, and the coolness and self possession of the men must be left mainly to the imagination. New York—the city proper, without reckoning the suburban cities and villages comprehended in the "Metropolitan Fire Department"—has no less than thirty-four steam fire engines. About one third are from the Amoskeag Manufacturing Company, Manchester N. H., the subject of our engraving being one of them. We append a description of "Metropolitan No. 1:"

The boiler of the steamer is 36 inches in diameter and 65 inches in length; it contains 313 copper tubes 24 inches long and one and a quarter inches in diameter. The boiler is of the best boiler plate cased in wood and covered with Russian iron, with brass bands, and with a brass dome and chimney casing.

There are two double-acting pumps lined with brass, four and a quarter inches in diameter, and 12-inch stroke, with rubber valves and brass valve seats.

The steam cylinders are eight inches in diameter and 12-inch stroke, working in the same piston rods with the pumps.

The engine is supplied with two lengths of best rubber suction hose, made upon copper rings four and a half inches in diameter inside. The suction pipe of the pumps is fitted on each side with a brass cup to close the openings if desired, and with a vacuum chamber made of burnished copper.

There are two discharge pipes for the leading hose, with a complete set of "nozzles" for change, from one and a half inches to seven eighths of an inch diameter.

THE METROPOLITAN STEAM FIRE ENGINE, NO. 1., EMPLOYED BY THE NEW YORK FIRE DEPARTMENT.

TRIAL OF ENGLISH AND AMERICAN BURGLAR-PROOF SAFES IN THE PARIS EXHIBITION--AN EXCITING SCENE.

Correspondence of Engineering.

PARIS, August 13, 1867.

The trial of the burglar-proof safes of Mr. Chatwood, of Bolton, and of Mr. S. F. Herring, of New York, or as our American friends like to call it, "the great contest of American es. English safes," has commenced at last in the British testing-house at the International Exhibition. The terms and history of the challenge we have already published, but it may be as well to refer to them in a few words before proceeding to report upon the trial itself. Mr. Herring exhibited a safe upon which he posted a challenge offering to test it against any other safe in the Exhibition. Mr. Chatwood accepted this challenge, and an agreement was drawn up to that effect. Mr. Herring then declared that his safe was not really burglar-proof at all, but simply fireproof; but that there was a burglar-proof box inside the safe, which was the article meant, if not named in the challenge. The appearance of these after declarations created a somewhat unfavorable impression against the American safe-maker, if not against his safe, which occasionally manifested itself during the trial; but the jury certainly tried to do all in their power to maintain the balance as even as circumstances would allow. The jury was chosen by the two competitors; Mr. R. Mallet and Mr. R. F. Fairlie having been proposed by Mr. Chatwood, and and Mr. Holmes and Mr. Pickering representing Mr. Herring's interest. These four gentlemen had chosen M. Paul Douliot, engineer of the firm of Cail & Co., of Paris, as their fifth member, and as their president; and Mr. W. T. Hoyle, secretary of the Whitworth Company, acted as secretary to this jury. The jury met at 11 A. M. to-day, after the preliminary arrangements had been completed, then the sham burglars were introduced, three in number on either side. They were some of the best workmen that could be mustered in England, America, and Germany. Mr. Chatwood had brought one of his foremen and a workman from his shop; the third man, a foreman at Messrs. W. and J. Galloway and Sons, in Manchester, had volunteered his services on the day of the trial. Mr. Herring had sent expressly to America for a celebrated safe-breaker, who was assisted by a man described as particularly expert at picking locks; and the third also a volunteer, who was the foreman of an Austrian exhibitor of safes, who had a very intimate acquaintance with the construction of Chatwood's safes, having been in the Exhibition ever since its opening, and repeatedly examined Mr. Chatwood's drawings and details of construction, which are exhibited without reserve. These six men, combined in two respective groups, were an interesting match, although the unequal nature of their capabilities somewhat lessened the interest of the trial. Mr. Chatwood had in his favor the calm and business-like method of his foreman, and an extraordinary amount of skill on the part of Messrs. Galloway's man in the use of his hammer, which attracted the just admiration of every one present. On the other hand Mr. Herring's man showed much judgement and experience, assisted, as it was, by the correct knowledge of the Austrian foreman. The *personnel* having been mustered on both sides, the tools were brought forward. Mr. Chatwood's men had their tools packed in a neat small leather portmanteau. The contents were the well-known serrated wedges used by expert burglars, some levers screwed together in short lengths so as to pack up easily, a small hand hammer and a block-tin hammer which gives no ringing noise in striking. Against this the Americans brought in a sledge hammer, the exact weight of which has not yet been ascertained, but which may have been somewhere about 28 lbs. There were several levers and crowbars 5 or 6 feet long, and a complete drilling-frame large enough to enclose the entire safe, and to insert the ratchet brace for drilling. Last but not least, came some steel wedges of an enormous size. Call these burglars' implements! The jury immediatrly objected to the employment of this portable blacksmith's shop, and the sensible suggestion was made to allow equal weight, and a maximum size of implements only on each side. This, however, could not be adheared to, since the American tools were not prepared for such a condition, and all parties, anxious to see the trial through, agreed to allow the heavy American tools to be used, with the exception only of some of the very large wedges. The jury allowed the sledge hammer to the Americans, reserving to Mr. Chatwood the right to use a similar one if he thought necessary. This, although it changed the entire nature of the trial, was wise on the part of the jury, since it has been proved by the trial itself, that without sledge-hammers the trials would have lasted much longer than anybody would have cared to witness the operations, except perhaps Mr. Chatwood and Mr. Herring. The operations commenced at 2.45 P. M. There was a clear space all around each safe reserved for the workmen and the two sets were divided by a screen. In front of the latter, Mr. Walker, the well-known watchmaker of Cornhill and Regent street placed one of his beautiful chronometers for taking the time occupied by the different operations. A piece of wood sufficiently small to be enclosed in the little box inside Mr. Herring's safe, was put into this latter box, and a piece of similar size was put into Mr. Chatwood's safe; but Mr. Chatwood would not put his block into the small box inside his safe, as he declared that the contest was between the two safes, and not between a series of boxes hidden one within the other. Mr. Chatwood's workmen commenced by applying their small wedges to Mr. Herring's safe, while Mr. Herring's men tried their chance in drilling through the door in front of Chatwood's lock. The wedges did their work expeditiously, although the want of acquaintance with the details of Mr. Herring's construction caused some loss of time, the workmen attempting to drive in wedges at a place where the outer plate of the door overlaped the other part, and could have been removed by a cross-cutting chisel, so as to allow the immediate insertion of the wedge. In spite of this drawback, however, Mr. Herring's safe was completely thrown open in 29 minutes. The audience cheered, and Mr. Herring called out that this was only the fire-proof part of his safe, to which the English workmen replied by knocking out all the drawers and shelves of the safe and throwing them out on the floor. Meanwhile the workmen on the other side had erected their drilling frame, and worked the ratchet-brace, but without success. The drill touching the spiegeleisen which is behind the outer plate of Chatwood's safes, refused to cut, and the work had to be given up as impracticable. They also tried to pick the lock and to apply steel screws and punches to the door, but they made no progress in that direction, and had to give up all idea of forcing the door. As far as the trial had gone on with real burglars' tools, it had lasted till 3:45 P. M. After that the sledge-hammer came into request. Mr. Herring's men commenced the attack upon the dovetailing at the corners of Chatwood's safe by driving in chisels with the sledge. Mr. Chatwood then requested that his men should also be provided with a sledge-hammer for breaking the small box which contained the wood block, and this was at once agreed to by the jury. The hammer was brought in at 4 P. M., and then an amount of battering began at each of the two safes, which will be remembered for some time by every one present. The fragments of chisels and wedges were flying about the room, and the din was so terrific that crowds of spectators collected outside. "This is not burglar's work," somebody remarked; "the police would soon stop such a proceeding." But the police in the Exhibition had quite enough to do to keep off the people attracted by the noise, and, as usual, they were courteous enough to hear nothing. The work went on for about half an hour. The English workmen had the disadvantage of working upon a very small surface, as afforded by the door of the small box, enclosed as it was inside a large chest, which prevented a fair blow from being struck in any direction. Here the unusual skill of the striker proved of great value; his blows very rarely missed, although they were sometimes applied in the most trying positions. At Chatwood's safe the manual skill was less; but the men, knowing every joint and every pin, made steady progress, step by step, all parts being perfectly accessible for their operations. The attack was made upon the side of the safe next to the lock of the door; the dovetails were wedged open singly, and each of the connecting studs binding the outer plate to the inner structure was cut through by itself with large chisels. At 4.35 P. M. the outer plate of Chatwood's safe was removed entirely, and the spiegeleisen laid bare. In this form spiegeleisen, as is

well known, has no resisting power, on account of its brittleness, and it therefore took a short time only to knock off this material with the crowbars, so as to arrive at the inner plate of Chatwood's safe. The same operation was repeated on this latter, and at 5.05 P. M. a ridge was opened, through which the ashes and other powdery substances forming the protection against fire, commenced to fall out. It took half an hour more to open up a crevice at the side of the door, through which the paint of the interior could be seen, yet the peculiar construction of the bolts prevented all possibility of widening that breech, and the work had to be re-commenced at the other side. The progress with Mr. Herring's safe was of a different character. The box was fastened inside the safe by an angle-iron girder, which had to be cut through to get access to the front plate of the door. Behind this the box itself consists of a thick front plate, tied to the back plate by a great number of steel bolts, about one inch diameter each, and riveted in with countersunk heads. Behind the front plate there is a construction somewhat resembling the plan of the Chalmers' target, viz., a series of steel plates put on edge, and having their interspaces filled with franklinite iron, which is very nearly the same material as the German spiegel, only made of American ore. The connection between the front and back plate of Herring's box came out to great advantage under these circumstances, since the smallness of the surface exposed to the attack, and the close proximity of the strengthening points, afford no proper working space nor leverage for the tools. This, however, is easy enough with so small a box as that inclosed in Mr. Herring's safe, while it is doubtful whether a larger safe of the same make would allow anything like the proportionate strength of connections. At 5.50 P. M. the workmen on both sides were allowed to rest, and operations were re-commenced at 6.35. At 7.15 the outer plate of Herring's box was thrown off, and wedges were immediately inserted to force open the rest of the door. Daylight was immediately afterwards visible in the small box of Herring's safe and it would have been possible to remove small valuables, such as coins, from this chest through the crevice made. The want of a larger wedge was felt towards the end of this operation, and the suggestion was made to allow Mr. Chatwood's men one wedge similar to those which were used on the other side. This however was not carried out, as Mr. Chatwood's safe had been broken into and the block of wood removed from it at this time, 7.25 P. M., the men having removed the side plate entirely, and cut a hole into the thin sheet-iron plate which forms the inside skin. The hole was just large enough to insert the hand and pull out the small wood block, but there was no access to any one of the drawers in Chatwood's safe, nor would it have been feasible to get at the block if it had been placed in the inside chest without expending a very considerable amount of further time and labor. Mr. Herring's safe being by this time so nearly destroyed that it appeared to be the work of a few minutes only to force the small box open, it was resolved to complete this operation on the following day. The trials were consequently adjourned at 7.40 P. M.

PARIS, August 14.

The jury met at 11 o'clock this morning, and, after deliberation, called upon Mr. Chatwood's men to complete their work, which was done in three minutes. This is only one of a series of tests which these safes are to undergo,and it will be acknowledged by every competent man that it was not of a very scientific character. The *résumé* stands simply as follows: The two safes were both "third-class bankers' safes" according to the maker's catalogues. They had each a small separate compartment inside the safe proper. Mr. Chatwood deposited his wooden block in his safe proper, making no use of the inside chest. Mr. Herring deposited his wooden block in the small chest within his safe. Mr. Chatwood's men were skillful, but unacquainted with the exact construction; Mr. Herring's men showed less manual dexterity, but an intimate acquaintance with the construction of Chatwood's safe. The tools of the English workmen were proper burglar's tools, while the tools of the American workmen were boiler-maker's implements of full size, and incomparably heavier than the others, including even the sledge-hammer given to the English workmen at a later hour. Under these conditions Herring's safe was opened in 29 minutes, and the contents of it thrown out to the public. Chatwood's safe proper had a hole made in its side in 4 hours 35 minutes working time. Herring's small box inside the safe was completely broken open within 4 hours 43 minutes working time. Chatwood's small box inside the safe was not opened at all in this trial.

Editorial Summary.

MONT CENIS RAILROAD.—A cable telegram states that the first train passed safely over this Alpine railway on August 28th. Descriptions of the road and notes of progress made in its construction have appeared from time to time in these columns, and in the present issue our foreign correspondent "Slade," restates these facts. The line over the mountains is forty-eight and a half miles in length. The tunnel, if ever finished, will furnish a route between the termini of the roads—St. Michel on the French side and Susa in Italy—six and a half miles shorter.

FOR THE NORTH POLE.—Preparations for the French expedition in search of the north-west passage are progressing on a most formidable scale. M. Lambert, who heads the expedition, proposes to go into the sea of Polymia, as the French call it, from Behring's Straits, and he has studied out a plan by which he pretends to be sure to attain his object. The Emperor has shown his confidence by heading the list of subscriptions with a sum of $10,000.

THE ANGORA AND CASHMERE GOATS.—We mentioned on page 268, last volume, that Mr. J. S. Diehl had been commissioned by Government to proceed to Europe and Asia, for the purpose of investigating the modes of manufacturing the wool from these goats, and now we have to report his progress. Writing from the Paris Exposition, he believes from all he can learn and see, that the raising of goats and manufacture of their hair and wool may be carried on more successfully in the United States than in Europe. He finds that nearly all the raw material from Asia and Russia is carded, combed, and spun in England, and then sent all over the Continent to be further manufactured. The American specimens of hair were pronounced by judges in Paris, Leeds, Hamburg, and Vienna, fully equal to the best imported. He writes: "I am fully satisfied that we can make the raising of these sheep a success, and their wool more valuable than any hair fleece or fabric now known."

CAOUTCHOUC.—This barbarous appellation is a corruption—it certainly cannot be called an improvement—of the South American Indian name *cahuchu*. Although ill-named, the industrial demands for the substance have become so important that experiments have been made in Brazil for cultivating the tree which furnishes the supply, in the same way as the quinquina has been grown in the Himalaya. For preserving the gum in a liquid form, as it comes from the tree, the liquor is filtered, then mixed with about one-eighteenth its weight of strong ammonia. On being poured out and exposed to a temperature of 70 to 100° Fah. the ammonia which preserved it from the action of the oxygen, evaporates, and leaves the gum shaped to correspond with the containing vessel.

$10,000 REWARD.—An English gentleman, who retains his incognito, but who is guaranteed by the chairman of the London Hospital, promises to bestow two thousand pounds sterling, on any person who before July 1st, 1868, shall have discovered any means by which in all, or nearly all cases, pain can be both permanently and completely annihilated, as it is now extinguished for a short time by anaesthetics. The means must be easy of application, not dangerous, and of moderate cost. In case this discovery is not made by that date, one half the above amount will be awarded for any kindred discoveries of minor importance, but yet of great service in the relief of pain. If the reward is accepted, the process must not be patented but given freely to the medical world at large.

THE EGYPTIAN LOTUS, is a fine aquatic plant sacred to Osiris and Isis, and regarded in Egyptian delineations as signifying the creation of the world. The only place where it is known to grow spontaneously in this country is in a pond in Middlesex county, Conn. The origin of the plant in this spot is not known, but here it flourishes in great perfection. The leaves, slightly resembling those of the pond lily, are nearly round and about two feet in diameter. The flower bud is long and pear shaped, white and slightly resembling the magnolia, when not unfolded.

PACIFIC TELEGRAPH PROJECT.—The Californians are seriously agitating the subject of laying a submarine telegraph from San Francisco to China and Japan, *via* the Sandwich Islands. Soundings made some years ago, prove the existence of a true telegraphic plateau extending from the California coast to Honolulu, quite as marked as the one between New Foundland and Ireland. The San Francisco *Bulletin* thinks the proposed plan is feasible, and is confident that it will be carried out.

FAST TRAVELING.—It is contemplated, on the completion of a new railroad from London to Liverpool, to run express trains which will surpass anything yet realized in railway traveling in any country. The whole distance between these stations—over two hundred miles—will be run without a single stoppage, and the time occupied will be four and a half hours, the speed being at the extraordinary rate of eighty-one miles an hour.

THE BEGINNING OF THE END.—As noted several weeks since in this journal, the Paris Exposition closes Nov. 1st. The materials of the palace and park, it is announced, will be shortly offered for sale, to be delivered as follows: The aquarium, trees, shrubs, and vegetable soil, on the 1st of November, and the iron work of the building by degrees, as the articles are removed, and at the latest on the 1st of January, 1868. A rumor which prevailed some time ago of the building being sold to Russia was erroneous.

THE TELEGRAPH.—It is officially announced that the Prussian government intends to extend the telegraphic system to every town with a population of one thousand five hundred. The extension will first commence in the province of Saxony.

IN noticing the "Victory Kerosene Lamp" last week, we omitted to say that the engraving and description, with the address of the manufacturer, is to be found on page 144, in our paper of Aug. 31, last page of advertisements.

The Mount Cenis Tunnel.

At the beginning of the present year 6,335 meters, a little less than one-fourth of the work, was completed. For the next six months ending June 30th, more work was done than on any half year since the commencement of operations in 1857. The number of meters excavated on the Italian side was 453; on the French side, 321; making the total length of excavations at that date 7,109 meters, or four and two fifths of English miles, leaving three and one-tenth miles yet to be dug. Progress on the French side has been slower than on the Italian, and in all probability nearly five years more will be required before its half will be finished.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The Bessemer steel works at Troy will soon be able to turn out fifty tuns of steel per day. Most of the steel is cast in ingots weighing several hundred pounds each. Small castings in sand are full of blow holes, but are claimed to be twice as strong as similar ones made of cast iron. The company are preparing to make steel railroad rails, and in Vermont, works are being erected for manufacturing steel locomotive tires.

The Ohio and Mississippi company are making arrangements for laying a third rail from St. Louis to Odin, making a narrow gage track, so that by the coming fall, cars will be enabled to run through to Cairo and Chicago without change.

It is said that upwards of five thousand different articles in common use are manufactured of the ordinary willow.

An inclined railway is to be built at Bahia, Brazil, for facilitating travel and the transportation of freight from the lower to the upper city. Heretofore both passengers and freight were carried over the steep bluff of one hundred and eighty feet high, dividing the city, on the backs of negroes.

Years since, black walnut furnished the most available fencing stuff in Ohio, and was generally used for that purpose. This year the shipment of black walnut lumber as a valuable wood from Toledo, from the opening of navigation, amounted to one hundred and twenty-five cargoes, aggregating 19,677,000 feet.

A paragraph has been circulating among our exchanges that a rubber belt thirty-six inches wide, one hundred and eighty-two feet long, and weighing 1,007 pounds, was the largest in the world. In another column we refer to a belt to which this distinction really belongs, this one being of three inches greater width, and three feet longer.

The manufacture of artificial fuel from consolidated coal-dust although commercially unsuccessful in this country has met with a very different result abroad. Twenty establishments in France produce yearly 500,000 tuns. In Belgium seven manufacturers turn out 400,000 tuns, while in other countries the product, though less, is very considerable.

Mining is being prosecuted in New Hampshire with good success. A mine in Lisbon has yielded $4000 in gold since January, and 417 tons of "dressed copper" have been taken from a mine in the same vicinity.

Learning experience from the lesson of last winter, the Pacific Railroad Company have roofed over ten miles of track in the mountain regions of California, as a protection against a blockade of the road by the heavy snows of these elevated regions.

It is reported that nearly all the rolling mills at Pittsburg will be started in the course of the next two weeks, and that the prospect of business in the fall for the manufacture of iron is good. The workmen who were formerly on strike at Pittsburg having compromised their difficulties, are ready to go to work again.

The next great gold field of the West, is believed to be the neighborhood of the Black Hills of Dakota, now known from actual demonstration to possess the precious metal in great profusion. These hills also it is said, contain silver, copper, and coal. The fine timber growing there, is unsurpassed in the world, and will prove of inestimable value when these regions are settled by a mining population.

The largest steel works in this country are located on the Susquehanna river, near Harrisburg. The steel trade is said to be very dull in England, and even the Bessemer Steel works are reported to be in want of new orders.

To the Rhenish Railway company is due the credit of first introducing a rail nine inches high, with the design of doing away entirely with sleepers, which in Europe forms quite an item in railroad repairs. The nine-inch rail rests upon a bed of plates which are covered with five inches of gravel and on top is a two inch layer of earth well stamped down so that the top of the rail projects only an inch above the surface. The two lines of rails are connected every three feet, so that the track resembles a ladder lying on the ground and half buried in it.

The work on the Kansas Pacific railway, west of Fort Hays, has been abandoned, on account of the Indians. The work on the Platte route is still going on rapidly.

It is estimated that in the first five months of 1867, there were imported into this country iron and steel worth $10,495,110—including 53,462 tuns of pig iron, 23,512 of bar, and 62,577 of railroad.

Fourteen cashmere goats have arrived at Mineral Point, Wis., the only ones now in the State. The animals are the property of a company, and have been imported at an expense of $2,500.

California capitalists are taking much interest in a proposed railroad from Marysville in their State, to Portland, Oregon. A survey of the southern end of the line has been begun. The route is through the Sacramento valley over an unbroken plain. The valley is one of the most fertile regions in the state, the first forty-two miles being a succession of harvest fields. The estimated cost of this end of the line for eighty miles, is only $12000, per mile. The serious difficulties will be found farther north.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

HORSE HAY FORK.—Charles D. Blinn, Port Huron, Mich.—This invention consists in constructing the prongs with a socket for the reception of the removable handle, and in the combination and arrangement of the loop or ring toggle and ropes, with each other and with the prong.

PORTABLE CRANE FOR LOADING WAGONS, ETC.—Amos Leitner, Hopewell, Ohio.—This invention has for its object to furnish a convenient portable machine for loading wagons, etc.

CORN HUSKER.—Daniel Williams, Saginaw City, Mich.—This invention has for its object to furnish a simple, cheap, convenient, and effective machine for use in husking corn.

WASHING MACHINE.—John Worden, Normal, Ill.—This invention has for its object to furnish an improved washing machine, simple in construction, quick and effective in its operation, which will not wear or injure the clothes and which can be manufactured at a comparatively small expense.

SPRING.—Edward C. Lewis, Auburn, N. Y.—This invention has for its object to furnish an improved manner of centering the leaves of springs and keeping the ends of the outer leaves in place upon the inner ones.

FLOATING FLEXIBLE FENCE.—John Pitcher, Mount Vernon, Ind.—This invention has for its object to furnish an improved floating fence, so constructed and arranged that it will adjust itself to the varying depth of the water and which shall be so flexible as to yield and not offer a rigid resistance to the water, while at the same time maintaining the same general position.

COTTON SEED PLANTER.—J. C. Tobias, Helena, Ark.—This invention relates to a new and improved device for planting cotton seed, and it consists of a revolving toothed wheel and a revolving toothed shaft placed within a suitable hopper, and used in connection with an adjustable slide at the bottom of the hopper, the latter being mounted on wheels and connected with a harrow, furrow opener, and a coverer, all arranged in such a manner as to insure the proper planting of the seed and the covering thereof with earth.

HORSE RAKE.—A. W. Coates, Alliance, Ohio.—This invention relates to a new and improved combination and arrangement of parts, whereby a very simple horse rake is obtained, one which will operate perfectly and be capable of being manipulated with the greatest facility.

COMBINED WASHER, WRINGER, AND TABLE.—James Whitney, Bristol, Vt.—This invention has for its object to furnish an improved machine by which clothes may be washed quickly and thoroughly, without wearing or tearing them, by which they may be conveniently wrung out when washed, and which, when not in use for washing purposes, may be used for a work table

WASHING MACHINE.—Adolph F. Kuhlman, Dubuque, Iowa.—This invention has for its object to improve the construction of the washing machine patented by the same inventor, August, 7, 1866, and numbered 56,955, so as to make it simpler in construction and more effective in operation.

MACHINE FOR CUTTING BERRY BOXES.—Charles Colby, South Pass, Ill.—This invention relates to a new and improved machine for cutting wooden strips for the manufacture of berry boxes. The invention consists of a reciprocating frame placed between suitable guides and provided with a knife for cutting the strips from the bolt and with an adjustable bed containing slitting or grooving cutters, and also provided with supports underneath for sustaining the strips while being cut from the bolt; all being so arranged that the desired work may be performed in a rapid and perfect manner.

TRACE BUCKLE.—E. J. Baker, Madison County, Wis.—This invention relates to an improvement in trace buckles, and consists in a double tongue, hung upon a central crank shaft which drops the two tongues at the same time, vertically into two holes in the trace for holding it fast, and lifts out of the holes at the same time to allow the trace to be adjusted or withdrawn from the buckle.

PUMP.—N. H. Sebby, Charleston, S. C.—This invention relates to the hanging of the wheel and its arrangement or attachment, within the casing of the pump.

MEDICAL COMPOUND.—O. W. Blanchard, Delavan, Wis.—This is a medical compound especially intended for the cure of consumption.

PAD BREAK AND CRIMP.—Hiram H. Beers, Toulon, Ill.—This invention relates to a self-adjusting pad break or crimp, for pad trees employed in the manufacture of harnesses.

GRATER.—Henry Stone, Williamsburgh, N. Y.—This grater is intended more particularly for grating stove blacking or polish, which is manufactured in solid lumps or cakes.

GASOLINE HEATING APPARATUS.—Jacob D. Spang, Dayton, Ohio. Patented August 27, 1867.—In this invention a new form of gasoline burner is used and a new device is employed for utilizing the heat of such burners and concentrating it upon particular points where the apparatus to be heated is situated.

GRUB AND STUMP PULLER.—Isaac H. Palmer, Lodi, Wis.—This invention relates to a new and improved machine for pulling grubs and stumps from the ground and consists in producing a powerful leverage by means of pivoted standards supported upon wheels the lower ends adjusted by means of suitable chains near together or further apart and whereby their upper ends are elevated or depressed.

AMALGAMATOR.—George B. Field, New York City.—In this invention the pulverizing roller has a backward and forward motion through the segment of a circle in an amalgam chamber of the proper form. The amalgam chambers, settling chambers, rollers and agitators, are so constructed and arranged that they will occupy a less space than in any amalgamator now in use. All the parts except the rollers and bottom of the amalgam chambers may be made of wood at a trifling expense, and the rollers and bottoms of the chambers may be made of stone or metal.

ROLL FOR ROLLING STEEL-FACED RAILS.—Samuel S. Potter, Wyandotte, Mich.—The peculiarity of this invention consists in means for making the steel occupy the upper surface and sides of the head of the completed rail as also sufficient of a core to give it stamina. The means employed for this purpose are rolls with peculiar grooves by which a portion of the iron is crowded or pressed back giving the steel a certain prominence or projection from the yet imperfect head or upper surface of the rail or that surface which will eventually occupy that position. The rail is passed through between the rolls in the succession of openings formed by their counterpart grooves. It is modified by each transit and up to a certain point the process does not differ from that in common use.

NURSERY LOUNGE.—S. Buttenheim, New York city.—This invention relates to a lounge, in which everything, almost, is contained which pertains to the comfort of a nursery. Within it are arranged a bureau, a writing desk with shelves, a folding table, an easy chair, and a night chair, of which either can be used at a time, or more at once, as may be desired. All these devices can be concealed, so that only a common lounge will be visible.

WASH-BOARD.—Lucien de Golia, Batchellersville, N. Y.—This invention relates to a new wash-board, which is provided with two corrugated surfaces, the one being formed in wood, the other in zinc. The object of the invention is to make one board answer all requirements, all kinds of garments to be washed, and so all notions as to the best kind of wash-boards; so if there are two parties in a house differing in opinion as to whether the metal or wooden wash-board is the best, this invention will satisfy both.

MATCHES.—Emory Andrews and Wm. Tucker, Fiskdale, Mass.—The object of this invention is to dip the matches before cutting. In order to effect this purpose, cards are prepared equal in width to the length of the matches to be produced, and of any desirable length. One edge of each of these cards is scolloped or notched so as to form a series of points or teeth, which can be dipped in the sulphur vat, in the explosive compound, and after the cards have thus been dipped, they are exposed to the action of suitable cutters, and the matches are ready for use.

WRENCH.—Theodore D, Christopher, Madison, Indiana.—This invention consists in combining a screw and ratchet wrench in such a manner that while the jaw is firmly held by a catch bar working in the ratchet, the jaw can be adjusted with the greatest nicety by the screw and nut.

REFRIGERATOR.—Anthony B. Sweetland, Fitchburg, Mass.—This invention consists in constructing the same with revolving shelves and in providing for the admission and discharge of air in a peculiar manner and in the general construction and combination of parts.

WATER CLOSET RECEIVER.—W. Smith, San Francisco, Cal.—This invention consists in constructing the receiver in two pieces and bolting them together whereby I am able to do away with the waste space behind the pan and to save much expense in carting.

GRIDDLE.—Edwin A. Jeffery, Trappe, Maryland.—This invention relates to a new and improved method of constructing griddles for baking cakes, and it consists in making the griddle in two separate parts one of which parts is reversible and the other stationary.

RINGS FOR RING SPINNING.—Henry G. Hall, Fayetteville, N. C.—This invention relates to an improvement in the construction of rings for ring spinspinning whereby the inside ring may be exactly adjusted or centered so that the spindle shall run perfectly true.

DEVICE FOR CATCHING ANIMALS.—W. L. Hopper, Monmouth, Ill.—The object of this invention is catching hogs and other domestic animals by a device that catches one leg and holds it fast.

COUPLING JOINT FOR THE PITMAN AND SICKLE BAR.—Wm. J. Keeney, Norwalk Co., Ohio.—This invention consists in coupling the pitman to the sickle bar of a reaping macaine with an adjustable knuckle joint formed by a movable box fitted against the end of the sickle bar, so that it can work freely and accurately while compensation for wear is fully provided for.

COTTON-BALE TIE.—S. J. Mitchell, St. Louis, Mo.—This invention relates to an improved construction of a fastening for the ends of iron hoops to secure them to a cotton or other bale.

LIFTING JACK.—J. N. Parker, Darlington, Wis.—This invention relates to a new and useful improvement in the construction of a jack for lifting the axles of wagons.

SWINGLETREE.—Martin Ryerson, Huntsville Co., Ala.—This invention relates to an improvement in swingletrees or doubletrees for wagons.

SWIVEL SHIP FENDER.—William Saffin, Sing Sing, N. Y.—The object of this improvement is to provide a fender for vessels which shall have a rotary motion, by means of swivels or rollers at the end or ends, to which the rope for suspending it is attached.

WAGON JACK.—J. M. Spitler, Clinton, Kansas.—This invention relates to an improved wagon jack.

SMOOTHING IRON.—John Fraser, Dowagiac, Mich.—This invention relates to an improved smoothing iron and consists in having the smoothing surface of copper attached to the body of the iron by rivets cas W the copper plate.

MACHINE FOR CLEANING BRASS TURNINGS AND FILINGS.—Julius Jonson, Baltimore, Md.—This machine was tested by a Board of Engineers at the Washington Navy Yard, August 8, 1867, and the following is an extract from the report made to the Chief of the Bureau of Steam Engineering.

"The machine is strictly correct in principle and very simple in its construction occupying but little space and functioned at a very small cost, about ten cents per diem. The patentee has ingeniously fitted a series of 'electro magnets' in a revolving cylinder, and so arranged the stops as to break the currents and discharge the particles of iron in one box while the brass is received into another, these performing the duty for which the machine was intended, viz: to separate the iron from the brass trimmings."

WASHING MACHINE.—Dr. E. Beckwith, South Pass, Ill.—This invention relates to a new washing machine which is adapted for washing coarse as well as fine articles in a very effectual and satisfactory manner. The machine is particularly intended to wash the articles when the same are rolled into a cylindrical form and is made in shape of a cylindrical shell within which a roller is eccentrically arranged so that between the corrugated surfaces of the shell androller the articles to be washed are thoroughly rolled and pressed.

SADIRON.—James Gray, Newark, N. J.—This invention relates to a new manner of securing a solid sadiron to a shield formed on the loose ends of the handle supports so that the handle is always kept cool and so that it can be easily taken off the iron and attached to the same for the purpose of making one handle available for many irons.

BRANDING BARRELS.—George St. George, New York city.—The object of this invention is to prevent fraud being practiced against the government by liquor dealers in the way of refilling whisky barrels which have not had the old brand marks thoroughly erased or cut out. These empty branded whisky barrels are purchased by distillers and wholesale liquor dealers from retail or small dealers and refilled and sold as legitimately branded whisky. The fault lies with the inspectors, who in many cases do not thoroughly erase the old brand marks, the operation being to rapidly performed and the facility for cutting out the marks not being very good. This invention is designed to obviate this difficulty, and it consists in having one of the heads or other part of the barrel constructed with raised or prominent surfaces, formed by grooves or otherwise, on which surfaces the brand is made or cut, and which raised surfaces may be readily chipped off when it is desired to remove the brand mark.

COMPOUND.—J. F. McCafferty, Forest, Ohio.—This compound is intended to be used in beehives to free them from moths and so retain them, without the least danger of injury to the bees.

STRAW CUTTING MACHINE.—Wm. Schreck, Des Moines, Iowa.—This invention relates to an improvement in the construction of machines for cutting straw, hay, etc., for feed for animals.

MASH AND BEER COOLER.—Charles Schenck, Manheim, Baden, Germany.—This invention relates to a new apparatus for cooling mash, beer, and other liquids, in which the liquid is poured upon a revolving disk, from which it is thrown by centrifugal power against the inside of a cylinder which revolves in a direction opposite to that in which the disk is rotated. The liquid thrown from the disk is spread and is deposited upon the inner wall of the cylinder in a thin sheet and flows down in a spiral ring along the cylinder. A current of cool air is, by a fan, which is arranged in the cylinder and which revolves with the disk, thrown against the liquid as the same flows down in the cylinder, and rapidly cools the same.

CLOTHES PIN.—H. T. Bootell, Springfield, Vt.—This invention relates to a new and improved clothes pin of simple and economical construction which admits of being readily adjusted to the line so as to secure the clothes thereon, and effectually prevent the same being casually detached from the line.

SEWING MACHINE.—W. S. Hill, Manchester, N. H.—This invention relates to certain improvements in the single thread or chain stitch sewing machine, and it consists in a novel feed mechanism, the mode of operating the looper and a general arrangement of parts, whereby a very simple and sufficient machine of the kind specified is obtained.

RIDING ATTACHMENT FOR HARROWS.—James M. Freeman, Belleville, N. Y. This invention relates to a new and improved riding attachment for harrows, whereby the driver, instead of walking behind or by the side of the harrow, may ride on a convenient seat and have much better control over the team and implement than heretotore.

BALING PRESS.—J. H. Godwin, Scotland Neck, N. C.—This invention relates to a new and improved press for compressing articles or substances into a small compass for baling. The invention consists in a novel construction and arrangement of the parts composing the press, whereby several advantages are obtained.

DEVICE FOR ELEVATING ICE.—Henry Little, Middletown, N. Y.—This invention relates to a new and improved device for elevating ice from the river, pond, or lake where it is cut, into the ice houses contiguous thereto, and is an improvement on a device for the same purpose for which letters patent were granted to this inventor, bearing date of May 21st, 1867. The present improvement consists in the application of a carved platform to the lower end of the screw elevator, and in the employment or use of a sectional raising and falling bearing to the lower part of the frame of the device, whereby the adjusting or placing of the cut or floating ice on the screen is greatly facilitated.

MACHINE FOR FILLING RUTS AND LEVELING ROADS.—John W. Minor and David P. Ward, New Bedford, Mass.—This invention consists in attaching to a suitable frame a pair of coulters or shares, and a pair of scrapers, and a heavy roller, whereby the ridges in the road are cut up and the earth loosenen and scraped with the rut by the scrapers, and the earth is rolled down level by the heavy roller.

BELLS.—Andrew Jusburg, Galva, Ill.—This invention consists in constructing the bells of a metallic composition hereinafter named and so forming the bells that there shall be different tones or sounds from bells of the same size and weight although formed of the same metal.

BED SPRING.—George B, Markham, Plymouth, Mich.—This invention relates to an improved bed spring and consists of several wires having one end of each formed into a loop or eye, each wire is then passed through a spiral spring and the straight end of each passed through the loop in the other. The straight end is then curved round into an eye to receive the loop attached to the slats.

SHEEP RACK.—J. S. Beals, Alabama Center, N. Y.—This invention consists in such an arrangement of the feed board and the board which is hinged thereto, that with a small amount of boards, and with a simple construction of the parts, the same and better results can be obtained, than with other sheep racks now in use.

PLOW.—J. S. Beals, Alabama Center, N. Y.—This invention consists in the construction of a supplemental share, and in the manner of securing the same to the standard, and in securing the colter to the lower end of the same standard on which the supplementary share is arranged.

APPARATUS FOR CARBURETING AIR, GAS, ETC.—George H. Peacock, Fairport, N. Y.—In this apparatus there is so combined and connected with a supply tank or reservoir for the liquid hydro-carbons, another vessel, into and through which the air or gas, etc., to be carburetted, is passed, that the liquid within the air vessel can be always kept at a uniform and even or given hight, or nearly so, whereby the air, etc., forced or passed into the same, from time to time, whether the apparatus has been running for a longer or shorter time, is always subjected to an equal or corresponding amount of the liquid hydro-carbons, thus producing a gas of uniform density and richness at all times.

BARREL, KEG, ETC.—Christopher S. Provost, New York City.—This invention relates to a barrel, keg, or cask, which is divided into two or more compartments by one or more partitions. The object of this invention is to arrange barrels for holding beer, cider, and other liquids, in such a manner that the said liquids may be kept free from the injurious influences of the air, as long as they are in the barrel.

PAINT CAN, ETC.—George W. Bennett, Brooklyn, N. Y.—This invention has for its object to furnish an improvement in the construction of cans for holding paint, and for other purposes, by means of which the can in which the paint or other substance is packed for storage or transportation, becomes a vessel from which it may be conveniently used.

FOLDING-DOOR BUTT.—B. F. Barker, San Francisco, Cal.—This invention consists in forming a butt in such a manner that it shall be a three-leaf hinge, folding together from a single butt, working alternately as the door swings back and forth from the center.

DUST BRUSH.—Ellis Thayer, Worcester, Mass.—This invention relates to a dust brush in which the bristles or hair are secured to a block, which is reversible on the holder, so that both ends of the brush may be used, and so that the brush need not be useless because one end is used up, while the other is still good.

PLOW.—L. L. Sloss, South Union, Ky.—This invention has for its object to furnish an improved means, simple, durable, and effective, for connecting or coupling shovel or other plows together for convenience in seeding small grain, and in cultivating corn, cotton, etc.

COTTON SCRAPER.—T. T. Fleming, Memphis, Tenn.—This invention relates to a new and improved implement for cultivating cotton, scraping the earth from the standing or growing plants, and it consists in constructing the scraper in such a manner that the blade or share is prevented from penetrating too deep into the earth, and also prevented from sliding laterally out of its proper course.

FENCE.—Benjamin Force, Mount Pleasant, Iowa.—This invention relates to a new and improved fence of that class which are commonly termed "portable," and are designed to be readily put up and taken down. The object of the invention is to obtain a simple, strong, and durable fence of the class specified, one which will be better braced than hitherto, and which will admit of being properly supported without having its stakes sunk into the ground.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at 50 cents a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

A. T., of Kansas, lives at a place 1,800 feet above the ocean level. He says: "We are setting a steam mill on a bank 31 feet above low water and 100 feet from the stream. We purpose setting the suction pump at the mill 8 feet below the surface of the ground which gives it 39 feet to suck the water and 8 feet to lift it to the heater. Will this plan work?" The plan will not work. You gain nothing by setting the pump 8 feet below the surface; you do not in that way lessen the force required to raise the water to the top of the bank 31 feet. We see no escape out of your difficulty but cutting a deep trench over the bank or setting a pumping apparatus at the water. A simple suction pump cannot be depended upon to raise water 31 feet even at the sea level.

E. M., of Tenn.—No solvent of plumbago is known, but you may make a very intimate mixture of it, with mineral substances and viscid liquids. Plumbago is one of the most durable substances known.

S. T. N.—Cotton seed oil is manufactured on a large scale in New Orleans, and is used for lubricating and for soap. . . . Platinum may be deposited on copper without much difficulty by the battery, but the deposited metal is not so dense, nor is it so little affected by corrosive substances as the hammered metal.

A. F., of Va.—Kaolin is simply a very pure species of clay, silicate of alumina. The purest natural silica or silicic acid, is crystallized quartz, but white sand is sometimes found nearly as pure. Kaolin and silica are used for porcelain and pottery, and silica, white sand, in addition, is in demand for glass making. The market for these articles is now pretty well supplied, but there is always room for superior qualities, and in the due progress of manufacture all the good beds of kaolin and sand in the country will be called for.

L. H. P., of Ill.—"What will be the power exerted in each hand while drawing out a spring balance, when it indicates 25 lbs., pulling horizontally, one hand on each end of the scale? Will the resistance be 50 lbs. or 25 lbs., with each hand or, 25 lbs. and 12½ respectively or otherwise?" The resistance on each hand will be 25 lbs. This is a new form of an old question.

L. and C., of Ind.—Solder is never directly used to unite a metal with glass; glass and metallic solders are incompatible. A metallic brilliance is often given to buttons and other small articles of glass by attaching to the back a bright metallic foil. The internal surface of glass ornaments are also sometimes silvered by a fusible amalgam.

S. N., of N. Y.—The black varnish liquid blacking for boots is not to be recommended. When the blacking becomes dull, it is difficult to remove the hard resinous matter from the leather.

J. C. T., of Ark.—It has often been proposed to carry up, with a balloon, hydrogen condensed in a metallic vessel, and to use the hydrogen as a reserve to keep the balloon inflated. But the idea seems impracticable; the weight of the vessel would more than counterbalance the ascensive power of any gas that it could contain.

W. B., of C. W.—The spent acid of the oil refineries is mostly used here for preparing super-phosphate or other manures. The acid does not bear much transportation, and should be used up where it is produced.

R. G. of Conn.—Sea sand is not a special and peculiar mineral formation, but is simply a finer sort of gravel. All the particles of sand and gravel were once undistinguishable parts of the solid rock. The variation of currents, etc., account for the deposition of such materials according to fineness in different localities.

S. C., of O.—We think you are mistaken. There is no alloy of lead and tin which has a higher melting point than lead. . . The ores of mercury which are worked are always solid.

Business and Personal.

The charge for insertion under this head is 50 cents a line.

IMPROVED METHOD OF HANGING SIDE ARMS.

The usual method of slinging sergeant's hangers and the dress swords of Knights Templars is objectionable because of the rigidity with which the sword is confined to the body. Every commissioned officer appreciates the advantages of the long slings by which his sword is attached to the belt and which allows perfect freedom of body. The design seen in the engraving secures this freedom to those who carry the straight sword. Instead of locking the sword in the belt itself, or a short frog attached to it, the sword plate—in the engraving a Maltese cross—is suspended from the belt by a looped chain, or a strap which insures perfect freedom to the motion of the body and adds much to the elegance of the equipment. In the engraving the hook on the scabbard is passed through the hole in the cross, which retains the sword secu-

rely in place. The design is very handsome and the plan convenient.

Patents for this improvement were granted through the Scientific American Patent Agency, Aug. 13, 1867. Rights and samples can be obtained by addressing the Virgil Price Manufacturing Company, 144 Green street, New York city.

PLAN FOR CITY STREETS.

A correspondent from Pittsburgh, Pa., A. R. H., proposes for the relief of crowded streets a series of iron wheel-ways for ordinary vehicles. He proposes rails of about one foot wide, the edges to be somewhat raised to retain the wheels on the rail, yet the lips being so formed that less obstruction would be offered to the turning of the wheels off the track than is presented by crossing the tracks now in use for street cars. Where the streets are wide enough the cars might run next the walk on either side, and ordinary vehicles occupy central tracks. He proposes, also the abolition of curbs, and that the walk and roadway be on the same level, the gutters being a sufficient depth, provided with frequent openings into the sewers, and be covered with movable gratings, so that passengers by the cars or ordinary vehicles need not wade through the mud of the streets in getting on or off.

We think the essential and prominent features of our correspondent's plan were proposed some time ago. This, however, does not detract from their value. We, nevertheless, cannot understand the value of his proposed improvement, especially in streets devoted mainly to business. If vehicles, like pedestrians going one way, held to one side of the street, or one track, and their progress was continual, it might do, but when the loading and unloading of teams compels the vehicle to block the way during the process, the continuous track would suffer many interruptions. Also, if the walk and roadway should be on the same level we cannot see how either those who rode or those who walked could be preserved from the mud and slush of the street.

One of the principal annoyances of passengers through the business streets of a city or town is occasioned by the work of loading and unloading goods. The team occupies a portion of the street and the skids make a bridge across the walk. The only remedy we know is a back or private way to every block or line of buildings as is the case in the modern and newer portions of Boston, Mass. The rear of the buildings has a roadway through which teams carrying coal, wood, milk, produce, merchandise, and goods of all kinds can drive, and unload or deposit in the rear of the building, while the street which fronts the block is kept free for carriages and pedestrians. The planning and arrangements of our city dwellings and business buildings is most disgraceful in this particular.

The Largest Circular Saw.

The largest circular saw on exhibition at Paris is from the United States, exhibited by the American Saw Company, Trenton, N. J. The plate was rolled in the celebrated works of Messrs, Jessop & Sons, Sheffield, England, and they certify that it was the largest circular plate ever rolled. The plate proper was seven feet and two inches in diameter and weighed 590 pounds, and was No. 2 gage in thickness. With Emerson's patent teeth inserted it was seven feet four inches in diameter. The furnace and tank being of sufficient size to heat a saw eight feet in diameter, there was no trouble in hardening and tempering the saw as perfectly as they could one as many inches in diameter. All told, thirty-five days, seven and a half hours were expended in smithing and straightening the saw. It was ground to 5 gage on the rim and 8 in the center, is without a blemish, and is true and in perfect condition to run. Allowing six inches for collars, it will cut a board 41 inches wide. It contains 48 teeth, the saw having been ground and polished with shanks of teeth inserted. These shanks were removed and the new teeth inserted and riveted without making the slightest perceptible difference in the strain of the saw.

On one side there is etched the American Eagle, holding in his beak the motto, *E Pluribus Unum*. Then follow the words, "Manufactured by the American Saw Company, New York, U. S. A. J. E. Emerson's Patent, Sept, 12, 1865, and Aug. 26, 1866. 88 inches in diameter—No. 581.

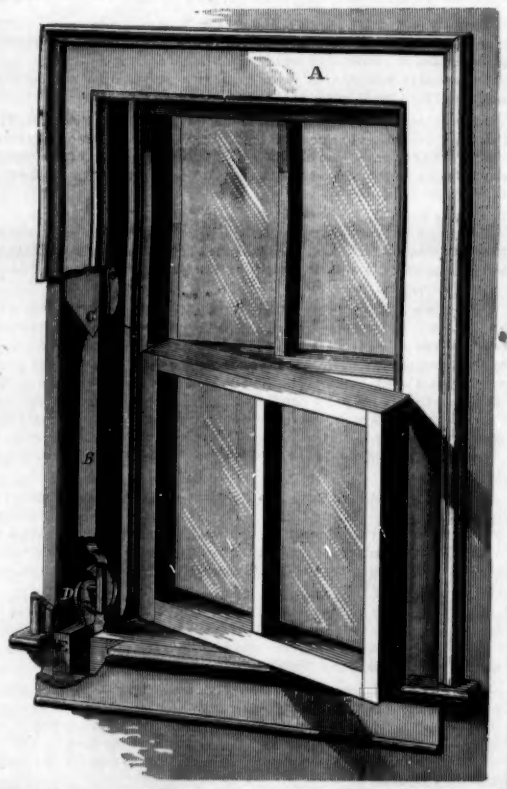
The manufacturers say this saw was so much larger than any that they ever manufactured before, that to get the stranger into the factory, they were in somewhat the same predicament as the man who won the elephant at a raffle, and had to take down and cut away parts of the building. In each room where the monster saw had to be introduced for the purpose of being properly prepared, a way had to be opened with ax and saw.

The mandrel hole is 2½ inches in diameter, and the pin holes ¾ of an inch in diameter and 4 inches apart from center to center. The saw is for a right hand mill. 375 or 400 revolutions per minute will be a proper speed for it to run; it is capable of cutting 6 inches to each revolution, and with fifty horse-power it is capable of sawing 50,000 feet of inch lumber in ten hours.

CROLEY'S IMPROVEMENT IN WINDOW FRAMES.

The object of the device which the engraving illustrates is to provide a ready means for removing the sashes of windows and adjusting the weights without disturbing the moldings, cases, or stops, and defacing the frame. The object is perfectly accomplished in an exceedingly simple manner, with no injury whatever to the window and no detraction from its elegance. The improvement can be made in any window frame already in place as well as in those in process of manufacture.

By reference to the engraving it will be seen that a portion of one of the slides is removable. Let A, represent a window frame, B is a portion of the slide which fits the permanent part at C, by a V-shaped joint, and is held in that fixed position by a cam-latch, D, on the lower end, which engages with the ledge, E. This latch turns on a stud passing through a circular plate of metal let into the slide so that the bar by which the catch is turned is flush with the outer surface of the slide.



Now if either sash is to be taken out the cam-latch is turned part round, which permits the movable piece of the slide to be dropped into the recess, E, when the piece can be withdrawn, leaving a wide, open space sufficiently deep to release the sash, when shoved into it, from the guide. The process of replacing the sashes is similar. After they are in place the movable piece is fitted at the top, the bottom held in place, and the catch turned. The same means of removal apply, of course, to the attachment of weights.

Patent papers for this improvement bear date April 9, 1867. Carpenters, builders, and manufacturers who may be interested can address the patentee, C. Croley, 168 Water street, Dayton, Ohio. Rights for sale and working models furnished if desired.

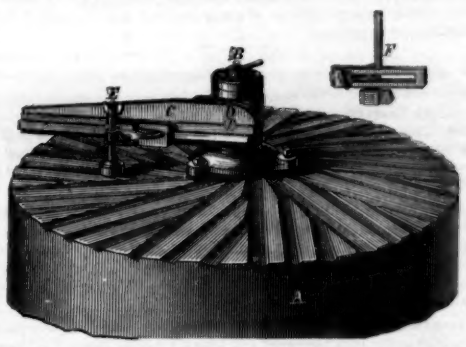
The Preservation of Wood.

Economy is the great source of the people's wealth. So the time and labor-saving machines and material-saving articles that have been and still are being invented in our country, saving time, labor and property, are first among the causes of the rapid increase of wealth, the prosperity, and growth of the United States.

Among the issues of patents noticed this week, in our journal, is one invented by S. G. Harding, of Morrison, Whiteside Co., Ill., under the name of "Harding's Wood Kyanizer," which bids fair to hold a prominent place among inventions in the benefits it is likely to accomplish for mankind. He claims by chemical and experimental knowledge that it will render any kind of wood harder, tougher, less combustible, and more durable, preserving wood from the decaying influences of the atmosphere, water and earth, three or four times longer than if used in its natural state. The principle of its working is to precipitate and coagulate the albumen, a putrifiable substance contained in the sap, and fix the ammonia, thus rendering those decaying elements passive, and harmless, also filling the pores of the wood with minerals that will make the stick almost as solid as stone, resisting the entrance of oxygen—the vegetable-destroying element—and water.

GILMORE'S DEVICE FOR STAFFING MILLSTONES.

The ordinary way of trueing a millstone is by the aid of a staff of wood, made generally of several pieces, and of wood not liable to springing or warping. In the eye of the stone



must be driven a center of wood in which a center point is made that shall govern all the after process. If a mistake is made in the initial process the further the work proceeds the more eccentric or further from truth is every subsequent operation. It is a matter of some delicacy, requiring good judgment and a correct mechanical eye to lay out a stone with these means. It consumes time and entails much labor and careful oversight. In fact, the workman has no permanent and reliable initial point and his labors are necessarily protracted, and when finished, sometimes unreliable.

Also, in making the lands and furrows there is involved a large expenditure of time and much carefulness. It is a continual testing and adjusting, annoying to the workman partly from the incessant labor and repeated trials of the correctness of his work, and partly from the doubt whether, when his work is finished, it will be correct. To aid the miller in these important preliminaries is the object of the device illustrated in the accompanying engraving.

A, represents a millstone having an upright stud secured to the eye of the stone by a bolt, which passes through a plate on the under side of the stone up through the stud, which is hollow, and is secured by the lever nut, B, on the top. The base of the stud is broad and furnished with three set screws, equi-distant from the center, which bear upon the stone and serve to adjust the stud in a position perpendicular to the face of the stone. A box fits the stud and carries a horizontal arm, C, the outer end of which can be raised or depressed turning on the pivot, D, which secures it to the box. The outer face of the arm has a dovetail rib on which slides a block that carries a marker, E.

To true the stone the stud should be secured to its center and adjusted by means of the set screws until the horizontal arm, when, with the marker it is swept around the stone, will shown an average level. The bottom of the marker is then painted and moved back and forth from circumference to center, or, with the arm, swept around the stone. The dressing of the stone follows, of course, the marks. F represents a marker adapted for laying out the furrows. It can be attached to the arm instead of the marker, E. The position of the arm relatively to the center of the stone is calculated so that the arm is parallel to the leading furrow. The operation of staffing the furrows is similar to that of leveling the stone's face. Practical millers will readily perceive the advantage of this staff.

For further particulars address L. Anderson, Painesville, Ohio.

New Water Mat.

Dr. J. L. Prentiss, of the Kansas State Medical Society suggests a very excellent and simple means of applying water dressings to the human body for medical purposes.

It consists of a light rubber tube about seven or eight feet in length, (longer or shorter as necessary), coiled in the form of a lamp mat, to the desired dimensions, and retained in shape by means of light cords extending from the center to the circumference, and tied around each coil, one end of the tube (from the center) being left of sufficient length to introduce into a pail of water, and the other (from the periphery), with a stop cock attached, extending to the waste pail.

By means of a current of water through this coil, any desired temperature may be produced and maintained. The smallest size tubing is the best and costs but little.

WE are indebted to O. B. Kinney, Esq., of the Raritan and Delaware Bay Railroad, for a fine specimen of fossil shark's teeth from the Squankum Marl pits, described in a recent number of our paper. These fossils, according to the calculations of geologists, once belonged to fish that swam around New Jersey in days prior to the Noachian flood.

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VOL. XVII., No. 11....[NEW SERIES.]....*Twenty-first Year.*

NEW YORK, SATURDAY, SEPTEMBER 14, 1867.

Contents:

(Illustrated articles are marked with an asterisk.)

BELTS—THEIR ELECTRICITY—HOW TO LAY OUT BELT HOLES THROUGH FLOORS.

A correspondent asks our opinion as to the danger of fire from the electricity generated by swiftly-moving belts, and another inquires how to lay out the holes for belts running through floors. We will endeavor to give replies to both questions, drawn from our experience and observation. No doubt some of our correspondents—practical men—may furnish valuable additional facts or theories drawn from practice.

We believe that many mysterious fires occurring in factories where belts were used to transmit power, would be no longer mysterious if the facts were known. But there are recorded facts which leave very little room to doubt that buildings have taken fire from this cause. Where fire itself in any form was not used in the building and even matches not introduced, there seems to be no adequate reason for doubt that either spontaneous combustion of fibrous material saturated with oil, or the action of electricity, was the cause of the fire.

As to the former we well remember a case, some thirty years ago, when some boys discovered a fire in a waste house connected with a cotton factory, caused solely by the heaping of oil-saturated cotton waste on the floor of an open-sided building, formerly used as a dry shed, through the sides of which the air had a free passage. A church, also a few years ago was destroyed in a town in Rhode Island by the flying particles of cotton waste which had spontaneously ignited in a storage building for waste. No fire was ever carried into the building, yet the spontaneous combustion of the saturated waste caused a serious loss of property by conflagration.

But extensive fires with great loss of property have been occasioned by the element of electricity generated by the running of belts. It is probable that the destruction of Colt's pistol factory in February, 1864, at Hartford, Conn., which involved the loss of one human life and much valuable property, was caused by the electricity generated by the main belts. The fire was first discovered under the cupola in the center of the building which was the locality where the great or main belt ran. Many a time we have elicited heavy sparks from that belt when the hand was held several inches from it. On a visit to the large machine-building establishment of Pratt, Whitney & Co., in the same city, passing under the main belt, which ran diagonally, we felt the electricity like particles of gravel rattling on the hat. To test the force of this element Mr. Pratt, with one hand presented to a gas burner and the other grasping ours, while we held another near the belt, succeeded in lighting the gas. If the amount of electricity developed by a running belt is sufficient to light a jet of gas it certainly is sufficient to start any other fire under favorable circumstances. Belt holes through floors should present smooth sides to prevent the lodgment of light particles which may act as tinder. It would be well also to place a simple apparatus near the belt, at the ceiling of each floor through which it passes, to convey away the electricity. It may consist of a horizontal comb, or a series of metallic points, arranged across the belt and in close proximity to it, and from this comb lead a wire of sufficient size to a tub or tank of water or any other wet spot. Probably this would convey the dangerous fluid away as fast as generated,

The plan for designating the point where a belt hole should be cut is very simple. Probably it is well understood by mechanics generally, but a brief statement, with directions, may be of interest and value to some of our readers. The shafting and arrangement of a factory is a matter of great importance, and he who undertakes it should thoroughly understand his business. An error committed here will continue to multiply itself and be a source of future annoyance. Cutting belt holes by "guess-work" or the "rule of thumb" is not very creditable to the mechanic. It defaces and injures the building and causes unsightly patching and repairs to the floor.

If a belt is to be carried from a pulley on an overhead shaft to another on the floor above, the distance from the center of the shaft (pulley) to the ceiling (under side of the floor) should be taken and noted. Next, get the distance through the floor; then between the floor itself and the center of the shaft in that story. If one pulley is directly over the other you have all the data, the diameter of pulleys and width of belt being known. But if the belt is to take a diagonal direction the relative positions of the pulleys must be found. A line measured from the side of the wall to a plummet dropped from the shafts on both floors will be generally sufficiently accurate to give the relative positions of the pulleys to be connected. Now from these data make a diagram either on an unoccupied floor, full size, or on a drawing board or sheet of paper, to a scale, and by transferring these measures, as represented on the diagram, an ordinary mechanic may easily bore the holes, and saw and chisel them to size. When the auger holes are bored it is a great assistance to stretch a twine, as a belt from one pulley to the other. It will be of much value as a guide to dressing and trueing the holes.

It is evident that by following or modifying these simple directions, holes for cross belts as well as straight belts, and, in fact belts of all sizes and directions can be laid out so that there will be no annoying and time-occupying alterations to be made.

HOW TO SUCCEED—WHAT CONSTITUTES SUCCESS.

It is well enough to encourage the hard worker, he who is engaged soul and body in his business or labor, to cast aside for a brief period his work and be as though he did not. It is well that the worker should at times lay by his peculiar character and cease to be a worker. "All work and no play makes Jack a dull boy." There must be a time for pleasure as well as a time for distasteful work. But there is a time for work; and that is when there is work to be done. Then we expect to see the man or even the would-be man, work. It is well enough to say to the worn out worker, in the words of the old college song:

"Omne bene
Sine pœne
Tempus est Indendi."

but for those just harnessed for the race of life their time for playing ought to come after the time of labor. To them it should be "Tempus est labori." Youth and manhood is the time for working.

The young man who thinks he can carry his boyish pranks into the serious business of life is not a man, and defrauds himself and his employer. "After work, play." That should satisfy the most sanguine. "Business before pleasure" is the motto of the prudent man whose guide is experience, and it is sufficient for the novitiate in active life.

But it is despicable to see the young man just starting in life so wedded to his former enjoyments as to place them above present duties. Yet this is often the case. The young man, who to steer his own bark launches forth on the sea of life, too often looks back on the pleasures he leaves behind, and, forgetful of present duties, steers back to past enjoyments.

To leave this figurative style, one of the most serious annoyances of the master mechanic, and the employer in any business, is the unwillingness or want of earnestness in his apprentice or employé. The young man foolishly supposes that he can at the same time do his duty as a learner in his chosen business and fill his place among his fellow playmates. An eye singled to the matter in hand is necessary to success. No looking back after the hand is placed to the plow. Work while the day lasts; these are lessons hard to learn and harder still to practice.

Yet the stern and unpalatable facts are that there is work, hard, and perhaps unpleasant work to be done. Why should not the beginner learn from those who have traveled the road what is required of him? But in this case, at least, the experience of others is worthless. The beginner in any business insists that he is wiser than those who went before. The apprentice performs his task not as though it was a part of his duty and a portion of his honor, but as a "stint" to be got over as quickly as possible, with the least expenditure of mental or physical force, and when it is finished, feels not only a relief from the labor and a joy of the release, but an utter distaste to its certain return, and a hope that the occasion to renew the labor may be by some means delayed.

There is no royal road to success any more than to knowledge. He who would succeed must work, and after all there is more real enjoyment in work, which has a worthy object, than in play or pleasure, intended to kill time. We remarked a few days ago to a business man whose present means are amply sufficient, but who worked really harder than any of his numerous employés, that he ought to "take it easy." Said he, "I am never so happy as when I have more than I can do. I may wear out in working, but I dread to rust out in idling." He was right. His work was a part of himself, a part of his life, and it was always faithfully done. To apprentices especially, this earnestness and interest in their work is necessary if success is ever to be attained. Where the attention is divided between the shop and the base ball grounds it is more than probable the latter will receive the larger share. And is not this so-called "national" game exerting a bad influence on our habits as workers and our welfare as a progressive people? Is it not occupying the time and usurping the place of useful labor? In short, is it not becoming an employment rather than a means of enjoyment? We must confess to but little sympathy with those who continually prate about our utter devotion to labor and business as a people, and who continually urge to pleasure seeking. Good, honest work is exercise as much as hard and exhaustive games. It is more. It is useful and productive and fully as healthy.

MICHAEL FARADAY.

A cable dispatch announces the death of Prof. Michael Faraday on the 27th of August.

Michael Faraday was born Sept. 22d, 1791, at Newington, Surrey. His father was a mechanic in such humble circumstances that young Faraday had little of the advantages of an education at school, At the age of fourteen he was apprenticed to a bookbinder. But he had learned to read and write, and thus the keys of knowledge were in his possession. He spent the leisure of his apprenticeship in reading and studying all the books on natural philosophy and chemistry which were accessible to him; his favorite amusement was to make experiments illustrating the teachings of his books. In the spring of 1812 he attended four lectures on scientific subjects delivered at the Royal Institution by Sir Humphrey Davy, who was then at the hight of his career. Faraday's tastes and aspirations were here confirmed and strengthened, and the character of his future pursuits was determined upon. In the December following he addressed a letter to Sir Humphrey Davy, modestly introducing himself, explaining his love of scientific studies, and offering his services as an assistant. The reply was prompt and favorable. Faraday at once became a favorite pupil, assistant, and friend. He was officially attached to the Royal Institution and took up his residence there. From that time forward the Royal Institution was the scene of all his labors.

The long list of his great scientific achievements begins with the discovery of the chlorides of carbon in 1820. It is an interesting fact that one of these substances has been found during the past year to be a valuable anæsthetic, and it is possible that it will supersede chloroform and ether. In 1821 he made the capital discovery of magneto-electricity, or electricity generated or induced by magnetism. During the last years of his life Faraday had the gratification of witnessing the application of his discovery, on the grandest scale for the practical production of light. His electrical researches were continued for a large portion of his life. His papers, originally published in the "Philosophical Transactions," constituting a complete and faithful record of all his contributions on electricity, were collected and published in 3 volumes, 8 vo. (1839, 1844, 1855,) under the title of "Experimental Researches in Electricity." It is chiefly upon this great work that Faraday owes his world-wide and lasting fame.

Many of Faraday's researches were eminently of a practical character. Thus he rendered important service to the manufacture of steel, glass, and india-rubber. He investigated and discovered new alloys of steel, and invented a new composition for optical glass. He found that carbonic acid and several other gases which had been supposed to be permanent were in fact a species of vapor, which may be condensed into the liquid or solid form by cold and pressure. In 1827 he published his "Chemical Manipulation," a work which has since passed through many editions and which is still a favorite with all chemists.

For nearly half a century Faraday has been one of the most eminent of men devoted to science. Learned societies and sovereigns vied with each other to do him honor. He bore his great eminence with childlike gracefulness. In his intercourse with men his artlessness and his love of truth won the admiration and esteem of all. No one ever felt jealous of his reputation, and no one ever disputed his title to his discoveries. As a lecturer he was charming by his earnest simplicity of action and expression; this is the universal testimony. His weekly lectures were one of the most attractive features of the London winter season.

Faraday has left an impress on human affairs which will endure forever. When our kings and presidents are forgotten, his name may still be a household word, for he has a place in history with Archimedes, Newton, and Franklin.

LARGE RUBBER BELTS.

Where belts are not to be exposed to saturation in animal oil or to frequent abrasion, a combination of rubber and canvas has proved to be fully equal, if not superior to leather, and much cheaper. For large belts rubber is preferable, because the belt, whatever its length or width, is one—not pieces joined by mechanical means or connected temporarily—but solid and to all intents and purposes one continuous fabric.

In front of the office of the New York Belting and Packing company, 38 Park Row, New York city, we noticed, the other day, a belt measuring 39 inches in width by 185 feet long weighing 1,470 pounds, and said to be the largest ever made. It was what is known as a "six-ply" belt, that is a belt composed of alternate layers, six of strong canvas and six of gum. It is intended for a grain elevator at Buffalo, for the Niagara Elevating Company, and now nearly completed. Beside this belt, which is to be their main connection with the prime mover, they have ordered from the same concern one belt nineteen inches wide by one hundred and thirty-three feet long; one of eighteen and a half inches wide by two hundred and thirty-six feet long; six of eighteen inches in width by lengths varying from two hundred and thirty-six feet to only thirty-eight feet; one of seventeen inches, one hundred and fifty-three feet long; beside several others of varying widths and lengths.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING AUGUST 27, 1867.

Reported Officially for the Scientific American

PATENTS ARE GRANTED FOR SEVENTEEN YEARS the following being a schedule of fees:—

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In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

68,027.—FISH HOOK.—Francois Angilard, Royan, France.

1st, I claim, in fish hooks, the arrangement of the line, l, and holes, e o, relatively to the two branches, a f, jointed together at the point, b, above the hole, o, substantially as and for the purpose herein specified.

2d, I claim, in connection with the above, the spring catch, c, arranged as specified, adapted to hold up the hinged branch, f, of a double-branched fish hook, and to release it with a very slight pull on the line, l, substantially as and for the purpose herein specified.

68,028.—COMPOUND FOR PURIFYING SPIRITS AND OTHER LIQUIDS.—Pierre Joseph Badoux, New York city.

1st, The composition, herein described, for purifying and discoloring spirits and other liquids, substantially as described.

2d, The combination of sulphur, lime, sulphate of zinc or iron, sulphate of baryta, and any acid or acids, as nitric, muriatic, or other mixture.

3d, The combination of bi-sulphate of lime, sulphate of zinc, and sulphate of bismuth or iron, for the purification of spirits.

68,029.—HINGING COVERS TO TOPS OF COOKING STOVES.—Chas. J. Ball, Keokuk, Iowa.

I claim the application to cooking stoves of covers or lids turning or revolving horizontally about a center outside of the apertures, and constructed substantially as specified.

68,030.—FRUIT PICKER.—A. T. Barnes (assignor to himself and N. M. Barnes), Tiffin, Ohio.

1st, The combination of the spring, E, fixed and movable jaws, and sack or fruit receiver, D, all arranged and operating substantially in the manner and for the purpose described.

2d, The use of the spring, E, which is applied to the fixed and movable jaws substantially in the manner and for the purposes described.

3d, The manner, herein shown and described, of guarding the spring, E, when arranged within a recess, formed substantially as explained.

68,031.—METHOD OF PROPELLING SLEDS BY HAND.—J. A. Bartlett and F. Walman, Orfordville, Wis.

I claim a hand-sled when constructed with a system of levers attached thereto to be operated by hand for propelling and steering the same, substantially as set forth.

68,032.—PLOW.—Alfred C. Belt, Goresville, Va.

1st, I claim the moldboard, C, made in the form shown and described, and provided with a cutting edge extending to or nearly to the plow beam, in the manner and for the purpose set forth.

2d, The grooved reversible share, G, constructed and operating substantially as described.

3d, The extension, double-reversible cutter, E, arranged and operating as described.

4th, The round adjustable self-sharpening extension point, H, operating as described.

5th, The false share for securing the removable cutter, share, and point in place, as described.

6th, The combination of the reversible cutter, reversible share, and adjustable extension point with the false share and moldboard, in the manner and for the purpose substantially as described.

68,033.—METHOD OF MAKING CORES FOR PIPE CASTING.—William E. Bird, West Bridgewater, Mass.

1st, I claim the method of forming a sand core by making on a platen a sheet of core material, of the desired shape and size, and then transferring it to the core spindle by causing the said spindle to roll over said sheet of core material, substantially as described and for the purpose set forth.

2d, The combination and arrangement of the platen with the adjustable revolving core spindle and chain, or its mechanical equivalent, made substantially as described and for the purpose set forth.

68,034.—CHURN.—Thomas Bogan, Lacon, Ill.

1st, I claim the combination of the treadle, H, rod, I, and gear wheels, J K, or their equivalent, with the paddle wheel, E, arranged and operating substantially as herein specified and shown.

2d, I claim the combination of the partition, B, provided with openings, a b, the slide, L, paddle wheel, E, and treadle, H, with intermediate gearing, arranged and operating as herein specified and shown.

68,035.—COTTON GIN AND PICKER.—John B. Brackett and W. Dearborn, Boston, Mass.

1st, I claim the employment of shark skin, dog fish skin, or shagreen dressed hides, as a covering for rollers of cotton gins, substantially as and for the purpose described.

2d, The method of adjusting pressure bar, D, by thumb screw, d, and set screw, f, arranged and operating substantially as described.

3d, The arrangement, described and shown, for adjusting and operating clearers, E, consisting of pivot pin, g, fixed in a slot of the frame by screw, n, and slotted side plate, h, of the clearer, and eccentric pin, i, revolved as described, all operating together in the manner set forth.

4th, The doffer, F, consisting of slotted cross bars with their rubber brush, p, sustained by wings, n, and clamping screws, o, upon shaft, m, the whole driven and operating substantially as described, and also when arranged with slotted brackets, g, as and for the purpose described.

5th, The arrangement, as a feed table to a cotton gin, or in combination with the feed table to a cotton gin, of the cleaning and feeding apparatus consisting of slaves, covers, toothed cylinders and fans, as and for the purpose described.

6th, The arrangement of fans, M or N, with toothed cylinders, in a cotton cleaner, all operating substantially as described.

68,036.—WASH BASIN.—William Bradley, Lynn, Mass.

I claim the combination of the wash basin and soap box or receptacle, attached together, as specified.

68,037.—EGG BEATER.—George E. Bridger, Milwaukee, Wis.

I claim cylinder, B, with support, I, and post, K, beater, C, shaft, D, pinion, E, shaft, F, cog wheel, G, and crank, H, arranged and combined substantially as and for the purpose described.

68,038.—STEAM-GENERATOR WATER GAGES.—Augustus P. Brown, New York city. Antedated June 11, 1867.

1st, I claim the arrangement of self-acting valves, F F1, between the ends of the glass tube, B, of a water gage, and the steam boiler to which said gage is attached, substantially as and for the purpose described.

2d, The springs, b b1, in combination with the valves, F F1, seats, a a1, and tube, B, constructed and operating substantially as and for the purpose set forth.

3d, The disks, c c1, on those ends of the valve stems which face the ends of the glass tube, B, substantially as and for the purpose described.

4th, The rod, d, and handle, e, in combination with the valve, F, seat, a, and tube, B, constructed and operating substantially as and for the purpose described.

68,039.—WATER WHEEL.—Wm. F. Browne and A. J. Hoyt, Washington, D. D.

We claim the combination of an inner centrifugal or reaction wheel, H, and outer wheel, I, which discharges downward and below the inner wheel through buckets, s s, that curve downward and backward, and the discharge apertures of which are of such size as to keep the wheel filled with water, substantially as and for the purpose herein specified.

We also claim valve, N, arranged in the induction pipe, D, between the valve, or gate, and the wheel, and operating substantially as and for the purpose herein set forth.

68,040.—TOOL FOR CLINCHING NAILS IN HORSESHOEING.—David W. Bush, Clarence, Mo.

I claim the combination of the arms, A1, the jaw, B, jaw, C, lip, e, springs, D, and stops, d1, as and for the purpose herein set forth.

68,041.—ELECTRICAL APPARATUS FOR PREVENTING INCRUSTATION OF STEAM BOILERS.—Samuel G. Cabell, Quincy, Ill.

1st, I claim the external chamber, C, attached to the steam boiler, when provided with a stop cock to cut off or regulate its communication therewith, for the purpose specified.

2d, In combination with the said chamber, C, a rod, F, constructed with points, G, arranged within the chamber and insulated therefrom, in the manner substantially as and for the purpose set forth.

3d, In combination with the chamber, C, and rod, F, constructed with points G, arranged within the chamber and insulated therefrom, said rod being a simple conductor, a permanent magnet, or composed of two dissimilar metals, substantially as and for the purpose described.

68,042.—HEMORRHOIDIAN.—R. A. Cameron, Valparaiso, Ind.

I claim the ellipsoidal bulb, A, having the prominence, B, when constructed and operated substantially as and for the purpose set forth.

68,043.—ATTACHMENT FOR CLOTHES WRINGER.—C. L. Carter, Union City, Ind.

I claim the arrangement of the saturator, a, with the wringer, as herein described for the purpose set forth.

68,044.—KILN FOR DRYING AND PREPARING PEAT.—Samuel Chapman, Newark, N. J.

1st, I claim the mode of desiccating, compressing, and extracting the oleaginous, bituminous, resinous, or other similar constituents, from peat and other substances, by the continued application of heat only in a tight chamber, substantially as set forth.

2d, The combination, within an air-tight chamber, of a heating apparatus, suitable supports for the material to be desiccated, and condenser for collecting and carrying off water evaporated, substantially as and for the purpose set forth.

3d, The combination of the roof, D, troughs, D1, well, E, and pipe, F, substantially as and for the purpose set forth.

4th, The combination of the stove or furnace, H, and pipes, I, arranged in relation to the air-tight chamber and one another, substantially as set forth.

5th, The combination of the stove or furnace, H, and pipes, K, arranged in relation to the air-tight chamber and one another, substantially as set forth.

6th, The combination and arrangement of drying frame, C, troughs, C1, and well, M, substantially as and for the purpose set forth.

7th, The process for drying and compressing peat by the continued application of heat alone, in an air-tight chamber, substantially as set forth.

68,045.—VAPOR BURNER FOR HEATING.—S. Child, Jr., and R. A. Copeland (assignors to Samuel Child, Jr.,) Baltimore, Md.

1st, In apparatus, as herein described, we claim the method of regulating the supply of fluid to the retort, by locating the opening through which the oil enters the retort, so that it shall be above the level, both of the valves for regulating the flow of the oil from the reservoir, and of that portion of the supply pipe between the said valve and the retort, substantially as described.

2d, In combination with one or more supply pipes, communicating with the retorts or vaporizing chambers through openings, arranged as described, we claim a regulating valve or cock, or equivalent device, placed at any point between the said supply pipes and the main or reservoir pipe, but so that it shall be below the level of the said openings whereby the flow of oil to each and every retort may be simultaneously regulated, substantially as shown and set forth.

3d, In combination with the pipes and main valve cock, arranged relatively to each other, as described, we claim the check valves, located in the respective openings through which the oil enters the retorts, so that by the movement of the main valves the said check valves shall operate automatically to open or close the entrances to the retorts, substantially as herein shown and set forth.

4th, We claim enclosing the supply pipe within a tubular jacket which carries the retorts, or itself constitutes the chamber in which the oil is vaporized, the said pipe and jacket being disconnected and separate, so as to form between them a continuous annular space in which the vaporized fluid is held, substantially as and for the purposes shown and set forth.

68,046.—ANIMAL TRAP.—Greville E. Clarke, Racine, Wis.

I claim the combination and arrangement of the pivoted platform, H, the piece, F, the strips or rods, E and D, and the door, B, when constructed and operating substantially as set forth.

68,047.—WEEDING HOE.—Eleazer M. Conkling, Parma, N. Y.

1st, I claim the combination of the coulter and keel, formed in one piece, with the blade, B, all constructed and arranged substantially as described.

2d, The blade, B, having its front edges arranged so as to form, if produced, a salient angle, and its rear edges so as to form re-entrant angle, substantially as described.

68,048.—CUTTER HEADS FOR PLANING MACHINES.—Mathew F. Connett, Ladoga, Ind.

I claim a cutter head for turning plow handles when constructed with the knives, B B, which are so arranged as to have a central space to limit the penetration of the cutters and guides at the edges of the cutter head, as and for the purpose specified.

68,049.—CHURN DASHER.—Jacob J. Cumming, Independence, Mo.

I claim a churn dasher combining in its construction the following elements:—The concave or dished bottom, the vertical openings, D, the diagonal openings, E, the lower flange, G, and the upper downwardly curved flange, F, said parts being arranged substantially as set forth.

68,050.—HAND SEED PLANTER.—H. V. Davis, Amherst, assignor to Benjamin Whiting, Hollis, N. H.

1st, I claim the combination with the wheel, E, and shaft, D, of the staple, C, and pin, d, substantially as set forth.

2d, The combination with the seed box, C, and handle, A, of the grooved guide piece, I, plow, J, lever, K, and covering device, M g g and h h, substantially as and for the purpose set forth.

3d, A hand seed planter, all the parts of which are constructed and combined together for operation, substantially as and for the purpose set forth.

68,051.—MEDICINE.—Jeremiah Dean, Freeport, Ill.

I claim the medicine prepared substantially as herein described.

68,052.—CONSTRUCTION OF RUBBER ROLLERS FOR COTTON GINS.—Wyman Dearborn, Boston, Mass.

I claim the washers, d, fixed on spindle, a, and rotating with it by tongue, f, fitting in groove, f, arranged alternately with elastic disks, c, on said spindle, and clamped together to substantially form a solid roll by clamping plates, b and g, as shown, and further held by wires, e, parallel to said spindle, substantially as described.

68,053.—SHUTTER FASTENING.—Benj. K. Dorwart (assignor to himself and Frank Stahl), Lancaster, Pa.

I claim the curved bolt, C, secured within the shutter between lugs, B, on a base plate, A, one end of the bolt to pass through an open slot in the bed plate, and the other end provided with a trigger, D, in combination with the slotted stop plate, F, and shouldered wall staple, H, all arranged and operated in the manner and for the purpose specified.

68,054.—CLOTHES DRYER.—John H. Doughty, N. Y. city.

1st, I claim the metallic thimble, c, in combination with the uprights, a, of a clothes-horse composed of two or more sections, substantially as and for the purpose described.

2d, The caps, e, and screw pivots, f, in combination with the uprights, a, of a clothes horse, constructed and operating substantially as and for the purpose set forth.

68,055.—APPARATUS FOR EXPLODING BY ELECTRICITY.—Jabez B. Dowse, Lockport, Ill.

1st, I claim the mode of fixing simultaneously, by electricity, two or more charges of explosive material by the application of two or more inductors, so arranged that one shock or current of electricity in passing simultaneously through the primary coils of such inductors, induces in the secondary coils of such inductors, simultaneously, separate secondary shocks or currents of electricity, each of which said secondary shocks or currents is made to fire separate charges of explosive materials simultaneously.

2d, The explosive compound, copper amalgam, consisting of finely divided copper and fulminate of mercury intimately mixed together with a liquid such as water.

68,056.—CULTIVATOR.—Reuben A. Eby, Upper Leacock Township, Pa.

1st, I claim the combined levers, R r r, as constructed and arranged for shifting two cultivators in unison, for the purpose and substantially in the manner specified.

2d, In combination with my combined shifting levers, R r r, I also claim the application of two separate cultivators attached to adjustable brackets, D, beneath a two-wheeled truck, substantially in the manner and for the purpose specified.

3d, In combination with adjustable brackets, D, I claim the arrangement of the combined adjustable scorers, x x, on the frame, z i, when constructed and applied in the manner and for the purpose specified, together with the use of the hoppers, crank and pulleys, all combined, substantially in the manner shown and set forth.

68,057.—LUBRICATOR FOR SHAFTING.—James G. Edgell, Brooklyn, N. Y.

1st, I claim the plug, C, provided with an opening in its end to communicate with pipe, F, and a cup, a, to receive and discharge oil as and for the purpose specified.

2d, The arrangement of the shaft, G, with its screw thread, E, and pulley, F, with the wheel, D, upon plug, C, substantially as and for the purpose set forth.

68,058.—ORE ROASTING FURNACE.—G. B. Field, N. Y. City.

1st, I claim the plate, or shelf, B, made hollow for the admission of water or steam, and composed of two parts, b b', connected by the pipes, c c', when constructed and used, substantially as and for the purpose specified.

2d, The orifices, E E, in hollow shelves used in the inside of revolving ore roasting furnaces, for the purpose of cleaning the internal chambers of the shelves, substantially as described.

68,059.—SHOE FASTENER.—John U. Fiester, Winchester, O.

I claim the double revolving concave hinge, A A', and B, constructed and operating as described, and for the purposes set forth.

68,060.—CHURN.—G. W. Fowler, Jenner's Cross Roads, Pa.

1st, I claim a churn, having two horizontal parallel dasher shafts, provided with radial arms arranged to strike in pairs alternately in the same plane, said shafts being provided with pintons, operated by the gear wheel, G, having teeth arranged on it, both internally and externally.

68,061.—BELT SHIFTING DEVICE.—A. M. Freeland, N. Y. City.

I claim the two belt shifting forks, connected and pivoted to a swinging arm, or sector, for simultaneous joint operation, substantially as described, whereby while the one belt is being moved on or off the fast pully, the belt controlled by the other fork has but a slight motion, and is retained to its run on the loose pulley, essentially as herein set forth.

68,062.—BALING PRESS.—George B. Garlinghouse, North Madison, Ind.

1st, I claim the abutment, F, capable of being set forward in the box, and supported by strut, X, in the desired combination, with the beater, E, and its described or equivalent accessories.

2d, The arrangement of gravitating toggle, H H, I I' i, J K, with the windlass, Q U V W, and horizontally or nearly horizontally moving beater, F, substantially as set forth.

3d, In combination with the elements of the 2d clause, I claim the auxiliary toggle, H'' i J K L i', and sheaves, M N, for the purpose explained.

4th, Constructing the pressing head of a baling press, with passages, e f, of size large enough to admit either or both hands and arms to the bottom of said "passages," for the object stated.

5th, The provision of the beam, 4, in combination with the hinged doors, 1 and 2, and catch, 5, and spring latch, 7.

68,063.—LIME KILN.—Luther Gibbs, Tremont, Ohio.

I claim a kiln for burning lime, when constructed with two furnaces, B B, and a central fire chamber, D, in continuous line across the kiln, and with flues, D, in the corners of the fire chamber, and with a kettle, F, of greater longitudinal measurement than the diameter of the cupola, E, and furnished with three draw flues, G G G2, said parts being constructed and arranged for use in the manner set forth.

68,064.—MILLING TOOL.—A. W. Gifford (assignor to E. A. Bayley and Moses Bayley), Worcester, Mass.

1st, I claim a milling tool, constructed and operating substantially as set forth.

2d, The combination with the hollow shank, A, and head, B, of the gage plate, D, substantially as and for the purposes described.

3d, The combination with the head, B, of the swivel arm, F, and cutter, E, substantially as and for the purpose set forth.

4th, The combination with the cutter, E, of the adjusting screw, i, arranged substantially as and for the purposes set forth.

5th, The combination with the cutter, E, and projections H' and J, of the head, B, of the adjusting screws, H and I i, substantially as and for the purposes set forth.

68,065.—GANG PLOW.—S. I. and G. M. Gillham, Carlisle, Ill.

We claim the bars, H H, embracing the beams, D D, and operated by the lever, G, arranged in combination with the frame, A, in the manner substantially as and for the purposes set forth.

68,066.—PAINT BRUSH.—H. B. Gillman, and H. S. Beamish, Milford Mass.

We claim the combination and arrangement of the conical case, a, with the head, b, fastened in it, and handle, A, screwing through it, and carrying the cone e, fastened to the handle, all as herein described.

68,067.—CHURN DASER.—Henry Grass, Olney, Ill.

1st, I claim the combination of the foraminous conical dasher, A, with the tubes, C C, substantially as and for the purpose specified.

2d, The tubes, C C, extending from the bottom of the dasher to the socket, B, and connected with the latter through the passages, c c, substantially as described.

68,068.—MEAT CUTTER.—John C. Haefele, N. Y. City.

1st, I claim in a meat cutter, such as described, the method of pivoting or hinging the system of levers to the knives, at a point vertically above the said knives, and equidistant or thereabouts from the ends of the same, as and for the purposes described.

2d, The combination with one or more segmental knives, of a system of levers pivoted to the said knives, at a central point vertically above the same, and hung in the frame of the machine in such manner that the levers immediately connected with the knives shall be parallel, or nearly so, with the surface of the block over which they move, as and for the purposes herein shown and set forth.

3d, The combination with the vibratory and rocking cutters of the lateral guides for maintaining the said cutters in the said plane, while in operation, as herein shown and described.

4th, The combination with the vibratory cutters, their actuating mechanism and lateral guides, arranged and operating as herein described, of a tub or block, revolving on its center, substantially in the manner and for the purposes shown and specified.

5th, The combination with the vibratory cutters of the guides provided with recesses forming the pivotal points upon which the cutters turn at the end of each stroke, as and for the purposes set forth.

6th, In a meat cutter in which the cutters are of segmental form, and operate as described, I claim the combination with the cutters and tub, or block, of mechanism, for vibrating the said cutters, and rotating the said block, in the manner described, so that the tub shall be rotated during the interval between the vibrations or strokes of the cutters, as and for the purposes set forth.

7th, The combination of the jawed reciprocating plate, and vibrating arm upon which it is mounted, with the shaft and cam for actuating the said plate, substantially in the manner and for the purposes specified.

8th, The combination of the reciprocating plate and pawls, and the ratchet and pinion operating together as described, with the meat tub or block, under the arrangement herein shown and specified.

68,069.—COMPOUND FOR PRESERVING WOOD.—Smith T. Harding, Morrison, Ill.

I claim a compound composed of the within-named ingredients, in or about the proportions as set forth, for the purpose of kyanizing wood, substantially as herein described.

68,070.—CORN PLANTER.—Samuel Harpster, Center Hall, Pa.

I claim, in combination with the brushes and flanged brush head, the slide, H, having a central and side holes counter sunk to prevent the grains from wedging therein, substantially as described.

I also claim, in combination with the brush head, and seed slide as described, the furrow openers, M N, and seed duct, K, and covercrs, O O, arranged and operating as and for the purpose described and represented.

68,071.—BOW DRILL STOCK.—D. Frank Hartford (assignor to himself and Edmund Tarbell), South Boston, Mass.

I claim the combination of the cord pulleys, A A', pawls, B B, ratchet, C, with the mandrel, D, and handle, H, when the whole is constructed as described, and for the purpose set forth.

68,072.—COOKING STOVE.—L. W. Harwood (assignor to Fuller Warren and Co.), Troy, N. Y.

I claim the suspended fire box, having an open front space, and with the oven space extending and up behind it, in combination with the dumping grate and ash pit, the whole arranged to operate as specified, for the purpose set forth.

68,073.—MEDICINE CASE.—J. R. Haynes, Newport, Ky., and A. F. Worthington (assignors to Smith & Worthington), Cincinnati, O.

1st, I claim the provision in a medicine case of one or more sliding, and folding vial racks, substantially as set forth.

2d, The provision upon such racks of the ledges, F F', for the purpose set forth.

68,074.—MECHANICAL MOVEMENT FOR WORKING SAWS, ETC.—Edward Healy, Chicago, Ill.

1st, I claim the combination of a system of levers, H, with a flexible connection, J, substantially as and for the purpose set forth.

2d, The arrangement of the levers, H, rock shaft, I, flexible connections, J, and springs, K, substantially as and for the purpose set forth.

68,075.—HORSE RAKE.—Josiah D. Heebner (assignor to himself, D. S. Keebner, and I. S. Keebner), Nonittonville, Pa.

1st, I claim the combination and arrangement of the tripping-pole, F, pivoted between its extremities, with the arm, G, and horizontal rod, I, substantially as herein shown and described.

2d, The lever, M, having a shoulder engaging at the proper time, with the carriage, K, or the rod, I, substantially as and for the purpose specified.

68,076.—WINDOW BLIND.—W. P. Hoffman, San Francisco, Cal.

I claim the window blind and anti-duster, composed of frame, A, V-shaped troughs, B B, with straight or concave sides, and having the openings, a a, the partitions, b b, and tubes, E G, the latter for the purpose of filling and emptying the troughs, substantially as and for the purpose set forth.

68,077.—DISTRIBUTING FERTILIZER.—Samuel Hoke, Mount Pleasant, Township, Md.

I claim the shape and construction of the stirrers, H, with their lower wheels, G, operating in eccentric apertures B, when arranged and operated as herein described, and for the purposes set forth.

68,078.—BED BOTTOM.—Zadok Howe, Lowell, Mich.

I claim suspending the slats, C C, at each end, in the swings, e e, which are secured to the foot and head rails of the bed, as and for the purpose set forth.

68,079.—KNIFE AND FORK CLEANER.—Benjamin F. Hughson, Cold Spring, N. Y.

1st, I claim the several series of transverse holes, d, formed in the disks, D, for the reception of the scouring material, substantially as herein set forth.

2d, The two central disks, g g, having their peripheries extended beyond the circumference of the main portion of the scouring wheel, substantially as herein set forth, for the purpose specified.

3d, The combination with the scouring wheel constructed as set forth, of the trough, A, substantially as and for the purpose specified.

68,080.—CHECK VALVE FOR LIQUID METERS.—Elias S. Hutchinson, Baltimore, Md.

I claim the application to a pump pipe of a thermo-dynamic valve, substantially as described.

68,081.—LIQUID AND SPIRIT METER.—Elias S. Hutchinson, Baltimore, Md.

1st, I claim the provision in a liquid meter of the plate, H3, and disk, I', or their equivalents, the same forming a means for compensating for variations in density, substantially as described.

2d, The provision in a liquid meter, of the plate, H2, and expansible rod, H9, or their equivalents, the same forming a means for compensations for variations in temperature, substantially as set forth.

3d, The combination of the oscillating valve, A, support, J, H H', compensating plate, H2, and disk, I', plate, h3, pin, j, wheels or disks, J J', shaft, J3, and catch, K, or their equivalent, all substantially as herein described and represented.

4th, The combination with the valve, B2 B3, of the levers, b b, and oscillating arm, A', substantially as described, and for the purpose specified.

5th, The combination with the oscillating valve, A, and chambers, B B', of the tilting trough, F F, arranged and operating substantially as described.

6th, In spirit meters, a filter or screen to permit the passage of mash, beer, or solid matter, into the meter, substantially as described.

68,082.—HAND CATCH.—J. P. R. James, Pepin, Minn.

I claim the body, A, constructed as described, and provided with the catches, B B, and spring, C, substantially as and for the purpose specified.

68,083.—LEVER FOR WINDLASSES.—F. A. Jameson, and Cyrus W. Ripley, Kingston, Mass.

1st, We claim the combination of the curved beam, D, adjustable or sliding saddles, F, and screw, G, having right and left hand threads, all for operation together, substantially as and for the purpose specified.

2d, The combination with the beam, D, sliding saddle, F, and screw, G, of the wheel, K, crank, m, and double pawl, l, with its reversible tail, n, or the equivalent of these devices, for operation of the saddles, without unshipping the brakes, essentially as specified.

3d, In combination with the beam, D, and sliding saddles, F, the traveler, H or H', and upper and lower rods, f g, substantially as herein set forth.

68,084.—GATE.—Cornelius Kark, Huntington, Ohio.

1st, I claim the carriers, E E', provided with cams, G G', and shoulders, H H', in combination with the rope, J, and pulley, I, as and for the purpose set forth.

2d, The pulley, I, arm, K, and link, K', as arranged in combination with the gate, B, for the purpose and in the manner as described.

3d, The levers, L, and M, weighted lever, N', and rod, a, arranged in combination with the carrier, E E', and pulley, I, when operated in the manner and for the purpose set forth.

68,085.—MACHINE FOR PICKING AND HUSKING CORN.—Silas R. Kenyon, Greenville, R. I., assignor to himself and Wilton C. Jeffers, New York City.

1st, I claim forming the hopper with an inclined bottom, having a central elevated portion that forms two troughs, on line with the pairs of husking rollers, f and z, h and i, so as to insure the delivery of the ears endwise, to such pairs of husking rollers, as specified.

2d, I claim placing the rollers, f and h, higher than the rollers, g and i, so as to insure the rotation of the ears as they pass endwise along such pairs of rollers as set forth.

3d, I claim the revolving bar, K, applied above the rollers, f, and h, to prevent ears of corn passing down the space between these rollers, and escaping unhusked, as set forth.

4th, I claim a series of inclined husking rollers, arranged substantially as shown and formed, with elastic grooved surfaces, to one or both rollers, of each pair, for the purposes set forth.

5th, I claim the adjustable, detaining strips, n, applied in the manner specified, in combination with the pairs of inclined husking rollers, for the purposes set forth.

6th, I claim the stripping bars or knives, q, fitted adjustably as set forth, in combination with the pairs of husking rollers, as set forth.

7th, I claim the combination of the guards, o, inclined husking rollers, hopper boards, m, and bar, k, to inclose the proper position of the ear in passing endwise down upon the inclined husking rollers, as set forth.

68,086.—FOOT REST FOR STOVES.—J. H. Keyser, N. Y. City.

1st, I claim an open work foot rest, which is constructed with annular tapering flanges, as a new and improved article of manufacture.

68,087.—UNITING EDGES OF HOSIERY GOODS.—Edward E. Kilbown, New Brunswick, N. J.

I claim the improved connection of hosiery goods, consisting of the combination of the loops of the adjacent abutting edges of the article, by means of the chain stitch hereinbefore described.

68,088.—TRANSMITTING PLANS OF BATTLE-FIELDS BY TELEGRAPH.—Thomas W. Knox, New York City.

I claim transmitting or giving plans of battle-fields, positions of troops, and topographical and other features of a country, by means of rectangular or other divisions, marked on blanks of paper or other material, and numbered in any agreed order only, as above set forth.

68,089.—WOODEN PAVEMENT.—P. Koch, New Haven, Conn.

I claim the construction and arrangement of wooden paving blocks, in the manner and for the purpose described and set forth.

68,090.—STEP AND EXTENSION LADDER.—C. J. Komar, Willoughby, Ohio.

1st, I claim the side rails, A, of the lower section, provided with longitudinal grooves, B B', pulleys, D D', opening, C, and tongue, T', and the side rails, K, of the upper section, provided with longitudinal grooves, L L', roller, N, openings, M, tongue, T, and hole, O, all arranged and operating in combination with the cord, S, and windlass, F, in the manner and for the purpose specified.

2d, The bars, H H', located and secured in the braces, G, in combination with the notches, P, of the side rails, K, operating as and for the purpose set forth.

68,091.—CORN PLANTER.—Lewis Larchar, Utica, N. Y.

1st, I claim the tooth, I, constructed and operating substantially as described, for the uses and purposes mentioned.

2d, The said tooth, I, and the teeth, K K, one or more, in combination, for the uses and purposes mentioned.

3d, The adjustment of the wheels, C C, and the hoppers, D D, relative to each other as described, by means of which the rows will be at equal distances apart, as described.

4th, The slide, D4, and the lever, E, and spring, D6, and cam lever, F, constructed and operating in combination, substantially as described, and for the uses and purposes mentioned.

5th, The lever, H, in combination with the pin or pins, H2, on the drum, C2, substantially as described, and for the uses and purposes mentioned.

68,092.—CORD TIGHTENER FOR CURTAINS.—Thomas C. Lippincott, Philadelphia, Pa.

I claim the combination of the sliding bar, A, constructed substantially as described, with the rack, B, by means of the tooth, b, of the bar, and the recessed teeth, c, of the rack, substantially as described, and for the purpose specified.

68,093.—CORK PRESS.—C. L. Lochman, Carlisle, Pa.

I claim a cork press, with one or both jaws made to vibrate, either straight or curved, so that a rotary and squeezing effect is given to a bottle cork at the same time, substantially as specified.

68,094.—CHANNELING AND BEVELING MACHINE.—Ira Manning, Philadelphia, Pa.

1st, I claim the combination and arrangement of a channeling knife and a beveling knife in the same machine, whereby a sole is channeled and beveled at the same time, as shown.

2d, Arranging the channeling and beveling knives so that either can be removed, whereby a sole can either be channeled or beveled, as shown.

3d, The barrel, I, when constructed, arranged, and operating substantially as shown and described.

4th, The adjusting plate, C, the friction roller, B, and the guide, c, as shown and described.

5th, The knife holder, D, and the arc G, as shown and described.

68,095.—THRASHING MACHINE AND SEPARATOR.—Hugh W. Mathews, Chicago, Ill.

I claim the combination of the rack, G G G, rakes, E, and conveyor, I, when constructed substantially as and for the purpose set forth.

68,096.—VAGINAL INVIGORATOR.—Morris Mattson, N. Y. city.

I claim an instrument for washing and cleaning the vagina and for treating diseases of that organ and of the womb, having an outlet perforated or open cylindr r, and within such cylinder an injecting tube for a spray or jet, substantially as and for the purposes set forth.

68,097.—CHURN.—John McKenzie, Portland, Me.

1st, I claim the dasher when composed of the hollow drum, m, inclined fingers, n, and adjustable washing roller, o, all operated by the removable shaft, a, as and for the purposes specified.

2d, The curved ventilating cover, E, constructed with the parts and applied as herein described and for the purposes set forth.

68,098.—BED BOTTOM SPRING.—E. D. Merrian and S. Aldrich, La Grange, O.

We claim the clamp, B, attached to the slat, A, and inclosing the rod, C, in combination with the looped hinge, D, elastic band, E, rod, H, and staples, G, fastened to the rail, F, when said several parts are respectively constructed and the whole arranged for use substantially as and for the purpose set forth

68,099.—CARTRIDGE EJECTOR FOR BREECH-LOADING FIREARMS.—Wm. H. and Geo. W. Miller, West Meriden, Conn.

We claim in combination with a hinged and swinging breech block, the accelerating lever, m, on said breech block, and the ejector, d, on the pivot pin of the hinge, for the purpose of giving a quick impulse to the ejector, and through it to the cartridge case, to throw the latter out of the gun, substantially as described.

68,100.—CHURN.—Mortimore B. Mills, East Mendon, N. Y.

I claim the dashers, D E, Fig. 2, when made so as to be actuated by the levers, C C, Fig. 1, and connections, E E, when arranged within the box, A, as and for the purpose set forth.

68,101.—MACHINE FOR GRINDING PEAT.—Simeon Mills, Jr.

1st, I claim the spirally fluted cylinders of rollers, E, whether conical or straight, so constructed and arranged that both are propelled in rotatory manner by the application of power to one without gearing, substantially as described and for the purposes set forth.

2d, The grooved feed roller, a b, in combination with the fluted rollers, E, when constructed and arranged to operate as described and for the purposes set forth.

3d, The spirally fluted rollers, E, in combination with each other and with the grooved feed rollers, a b, and mandrel, d, when arranged to operate in a close-fitting case substantially as described and for the purposes set forth.

68,102.—PLOW.—Gilpin Moore (assignor to himself and Deere & Co.), Moline, Ill.

1st, I claim the plan or method herein described of constructing the mold boards of plows.

2d, A plow having its mold board constructed of a form corresponding with the form of the under surface of the furrow slice at the instant it is severed from the earth, substantially as described.

68,103.—FRAME FOR WINDOW SCREEN.—Willim H. Nash, Reading, Mass.

I claim as a new article of manufacture a frame for a window screen when constructed of the bars, D D' D'' D''', and the corner pieces, A, made substantially as described.

68,104.—CULTIVATOR.—Edward Newlon, Monmouth, Ill.

I claim the vertical adjustment of beams y y, in combination with the frame, constructed as described and for the purpose set forth, in connection with the mode of attaching the draft.

68,105.—CAR COUPLING.—Geo. W. Noyes, Norwich, Conn.

I claim the adjustable head, C, and pin, E, with its devices, L and M, for operating the same, all constructed and arranged as herein described and for the purposes set forth.

68,106.—CEMENT FOR ROOFING.—J. D. Numan, J. T. Wilkinson, and E. W. Cook, Lockport, N. Y., assignors to J. D. Numan, Jas. T. Wilkinson, Jas. T. Wilkinson, Jr., W. B. Chase, and J. L. Ashley.

We claim the aforesaid cement for roofing or other purposes composed of the aforesaid substances or materials, or substantially the same, and which will produce the same intended effect.

68,107.—KNITTING MACHINE.—John Pepper, Lake Village, N. H.

1st, I claim in combination with an interior pivoted cam or switch, a slide or its mechanical equivalent, for raising or lowering said cam or switch, and thus changing the cam groove and lowering or raising the needles, for changing the machine from common ribbed to plaited ribbed work, or vice versa, substantially as described.

2d, I also claim the revolving pin wheel, m, in combination with a stationary pin or pins, for the purpose of moving an interior cam or switch, and changing the traverse of the needles at that point for changing the machine from tighter to looser knitting or vice versa, substantially as herein described.

68,108.—CLUTCH SHIPPERS.—Frank J. Plummer (assignor to R. Bell & Co.), Worcester, Mass.

1st, I claim the combination with the projection, E, of box, B, and tongue, c, of the slotted slide, F, and cap, I, substantially as and for the purposes as set forth.

2d, The combination with frame, A, double slotted or grooved slide piece, E, clasp, G, and clutch hub, L, of the box, B, having a flange, D, and projections, E and 4 4, arranged and combined together for use substantially as set forth.

68,109.—PRUNING KNIFE, HOOK, AND SAW.—Roger W. Porter, Nashua, N. H.

I claim pruning hook, knife, chisel, and saw, constructed and arranged as shown, in combination.

68,110.—MACHINE FOR PULVERIZING THE EARTH PREPARATORY TO PLANTING.—John Prutzman, Hancock, Ill.

I claim the combination of knives, shovels, and teeth, substantially as set forth, and secured in an adjustable frame which can be raised or depressed, together with a large shovel or marker for laying off the ground, and detent, O, substantially as and for the purpose set forth.

68,111.—FEEDING RACK FOR STOCK.—J. C. Ramsey (assignor to himself and S. M. England), Le Roy, O.

I claim the combination and arrangement of the box, A, rack, B, springs E, slide, I, adjustable bottom, D', and loop or staple, H, for the purpose and in the manner herein set forth.

68,112.—ADJUSTABLE PIPE JOINTS.—J. H. Rhodes, Brooklyn, N. Y.

I claim a pipe joint constructed of a hard-metal spigot, B, and hard-metal bell, D, both of shape corresponding to the segment of a sphere, in combination with the soft metal packing, E, arranged as a fixture in the mouth of the bell and resting at its inner end or edge against a projection or stop, S, substantially as and for the purpose or purposes as herein set forth.

68,113.—MAKING THE EYE OF ELLIPTIC SPRINGS.—W. T. Richards, Bridgeport, Conn.

1st, I claim the combination of the dies, g i and j, with the lever, D, or its equivalent, when they are constructed, arranged, and fitted to scarf the end and partially form the eye, substantially as herein described.

2d, I claim the combination of the dies, n and r, with the head of the ram, p, when the head is provided with a tongue, o, and the die, n, has a slot or recess, m, to receive the tongue and the whole is fitted to produce the result of finishing the eye, substantially as herein described,

68,114.—COMBINED PLOW AND CULTIVATOR.—Anton Romann and John Peterka, Wilton, Iowa.

We claim the form and construction of the cultivator and harrow combined, when arranged, adjusted, and operated with the bolt, F, beam, C, and axle, M, as attached to the frame or bars, G, with the regulating wheels, L, as herein described and for the purposes set forth.

68,115.—STEAM SLED.—John S. Rose, Hamilton Co., Iowa.

I claim the arrangement and combination of the adjustable knives, I, with the runners, A, when operated by the wheel, P, as herein described and for the purposes set forth.

68,116.—SHEATHING OF SHIPS' BOTTOMS.—François Louis Roux, Toulon, France. Patented in France Jan. 25, 1866.

I claim the application of copper sheathing to ships or vessels constructed or plated with iron, in combination with interposed layers of insulating material, in manner and for the purposes substantially as herein set forth and represented in Figs. 17 to 24, of the annexed drawings.

68,117.—PRESS.—Christopher E. Rymes, Somerville, Mass.

1st, I claim the improved hydraulic press constructed with the plunger so affixed to its frame as to be capable of being moved laterally with respect to its drum and piston, substantially as and for the purpose specified.

2d, I also claim the combination of the centralizing pin and cavity, or the equivalent thereof, with the piston and discharging pan of the hydraulic press.

3d, I also claim the discharging pan as made with the abutments arranged within it, as and for the purpose specified.

68,118.—CONVERTING IRON INTO STEEL.—S. C. Salisbury, New York city.

I claim converting iron into steel, while the former is in a liquid state and it is delivered from the furnace in which the ores are reduced by the use and application to or passing through such liquid iron a blast of steam or hydrogen and oxygen heated to a temperature of from 700° to 800° Fah., or thereabout, in combination first with an air blast and afterward with carbon gas free from or obtained from hydrocarbons free from sulphur, phosphorus, etc., and either with or without manganese.

68,119.—APPARATUS FOR SUPPLYING GASES TO FURNACES.—S. C. Salisbury, New York city.

I claim the combination of the generator, A, and exhaust chamber or mixer, C, with the tweer, E, or its equivalent, for generating and heating, mixing, and supplying to blast or other furnaces, hydrogen and oxygen gases or their equivalent, and carbon gas or other gases in connection with the air blast, for the purposes set forth.

68,120.—CAR COUPLING.—P. H. Schuyler, Lyme, O.

1st, I claim the lever, C, dog, E, spring, a, and shaft, D', arranged and operating as and for the purpose set forth.

2d, The arm, I, shaft, D', spring, a, in combination with the link, F, as and for the purpose set forth.

68,121.—CARRIAGES HINGE.—C. E. Schwind, New York city.

I claim the detachable piece or slide, B, in combination with the two parts, A C, substantially as and for the purpose specified.

68,122.—RAILROAD RAIL JOINT.—Benjamin Scott, New Brighton, Pa

1st, I claim the combination of the two rigid parts, B B, of a divided clamp joint, constructed with jaws, b b, fitting closely around the base and neck of the rails and downwardly projecting flanges, a a, meeting at their lower edges, D, and beveled upward to form a space, l, between them, when used in connection with bolts, g, passed through the flanges, a a, above the fulcrum point, D, all as herein shown and described and for the purposes specified.

2d, I further claim in combination with the above, the block of hard wood, E, fitting the angle between the flange and body of the clamps to facilitate the working of the nuts from above, and to obviate the jar and thereby prevent the unscrewing of the nuts.

68,123.—SWINGNOSE BASIN FAUCETS.—N. Scraunage, W. Scraunage, and W. H. Bate, Boston, Mass.

We claim a swingnose basin faucet when the several parts, A B E O F and H, thereof are constructed and arranged substantially as described and for the purpose set forth.

68,124.—WHEEL CULTIVATOR.—W. A. Sisson, Sheffield, Ill.

I claim a wheel cultivator constructed so that the draft power shall be applied direct to the shovel frame, and the driver's seat mounted upon the carriage frame, which is attached to the shovel frame at its forward end by a loose connection which permits said carriage frame to rise and fall with the undulations of the ground in any direction without affecting the operation of the shovel frame.

2d, The friction rollers, x x, at the forward ends of the carriage frame, in combination with the loops, H H, substantially as and for the purpose set forth.

3d, The perforated plates, P P, in combination with the legs, k k, of the driver's seat fitted so as to be inserted into said perforations for the purpose of adjustment as set forth.

4th, The handles, O O, at the sides of the shovel frame to enable the driver to raise said frame and free the shovels from the ground.

68,125.—SORGHUM SUGAR EVAPORATOR.—A. B. Smith, Clinton, Pa.

1st, I claim the arrangement of the transferring pipes, a b c, in connection with the evaporating pans, so as to draw the syrup from the middle thereof, or where the greater ebullition takes place therein, for the purpose herein specified.

2d, I also claim the adjustable transferring pipe, b, arranged substantially as and for the purpose herein set forth.

3d, I also claim the valves, f h, applied to the pipes, a c, for the purpose herein set forth.

4th, I also claim the combination and arrangement of the filtering pan, E, and pipe, b, substantially as herein s, ecified.

68,126.—CHIMNEY TOP.—John Snively, Williamsburg, Pa.

I claim the combination of the slightly convex cover, A, when fixed within the top of a chimney, with the vertical shaft or spindle, G, the arm, D, vane, F, and the screen, E, all constructed, combined, and arranged substantially as and for the purpose specified.

68,127.—COMBINED WATER METER AND FORCE PUMP.—Elihu Spencer, Elizabeth, N. J.

I claim the attachment of the force pumps, a a, to the water meter, acting and operating in combination with each other, substantially as and for the purpose specified and set forth.

68,128.—WRENCH.—Joseph A. Talpey, Somerville, assignor to himself and Mellen Bray, Boston, Mass.

I claim the wrench herein described, provided with two sets of jaws, the one rectangular with respect to the shank of the said wrench, the other sloping or at an inclination to the same, as and for the purpose herein shown and set forth.

68,129.—INDICATOR FOR WATER CLOSETS.—Henry K. Taylor, London, Eng. Patented in England April 20, 1865.

I claim the combination with the latch bolt or fastening to the door, of an indicator made visible from the exterior by the action of the fastening, substantially as and for the purpose or purposes herein set forth.

68,130.—AXLE.—Henry T. Tichenor, Fort Branch, Ind.

I claim the combination of the skeins, a a, plate, x, bands, b b, collar, E, and cap, D, with pin, d, when arranged and used with axle and hub in the manner and for the purposes specified.

68,131.—SNOUT RING FOR SWINE.—Miron G. Tousley, Fulton, assignor to Andrew and John P. Chaiser, Cardova, Ill.

I claim the hook or angle combining the lever, C, with its means of attachment, A, when constructed and used substantially in the manner and for the purposes set forth.

68,132.—MACHINE FOR PULLING FLAX.—Samuel W. Tyler, Troy, N. Y.

I claim for harvesting flax and other crops which require pulling from the ground, pullers which have traveling movement of their own and are made elastic and pliable or yielding on their impinging or grasping surfaces, by the use of india rubber, gutta percha, or other suitably elastic material, for the purposes substantially as set forth.

68,133.—CAR SPRING.—Richard Vose, New York city.

I claim a volute or spirally coiled spring formed of a metallic bar or strip, transversely crimped or corrugated, substantially in the manner herein set forth.

68,134.—CAR SPRING.—Richard Vose, New York City.

1st, I claim a volute spring so constructed as that its top and base shall be in horizontal or parallel planes, and its inner coil be uniform in width with those succeeding it substantially as herein described.

2d, I claim also a volute spring constructed of a metallic bar gradually increasing in thickness outwardly from its center to its edges throughout its length, substantially in the manner herein set forth.

68,135.—PROCESS OF REFINING LEAD.—Oscar Wassermann, Cali, Prussia.

1st, I claim treating work lead which has been desilvered by the aid of zinc with chloride of lead, substantially as and for the purpose described.

2d, Treating work lead which has been desolved by the aid of zinc with chloride of lead and alkalies such as soda or potash, substantially as and for the purpose set forth.

68,136.—LAMP.—H. Weston, Towanda, Pa.

I claim forming a recess or groove in the top of the lamp body around the opening which receives the lamp top with its wick tube, said groove having perforations from its bottom into the lamp substantially as and for the purpose set forth.

68,137.—CIRCULAR SAWING MACHINE.—Ralph V. Whiting, (assignor to D. B. Gurney,) Abington, Mass.

I claim so arranging the weights which draw back the slide or carriage of a board sawing machine that when the carriage first starts to return the combined weights pull in one direction and in aid of each other, but when the carriage has passed a certain distance and has with its load acquired quite a momentum, the weights will act in opposition to each other and thus cease to give additional velocity to the carriage substantially as described and for the purpose set forth.

68,138.—LOCK CLASP FOR UMBRELLA.—Andrew H. Whitney, Portland Maine.

I claim the lock clasp for umbrellas combining the chamber band and spring as described.

68,139.—GRATE FOR FURNACE.—Wm. A. Wilson and James Smith, Liverpool, Eng.

1st, We claim causing two or more of the bars of which a furnace fire grate is composed, to move together in one direction and then causing them to move back a less number at a time, substantially as and for the purpose herein set forth.

2d, We claim in connection with the above the combination of parts herein described, consisting of bars, a, drums, n r, and their attachments and operating mechanism, i j k m, or their respective equivalents, adapted for causing bars to move in the manner substantially as herein set forth.

68,140.—HORSE RAKE.—John Zimmerman, Powhatan, Md.

I claim the reversible head, A, provided with the teeth, C, handle, h, and sockets, e, journaled to the curved shafts, B, and having the runners, a, attached all constructed and arranged to operate as set forth.

68,141.—BEEHIVE.—Davis L. Adair, Hawesville, Ky.

I claim the honey box constructed as described consisting of the sections, D, provided with the projecting top and bottom pieces, F G, fitting the tops and bottoms of the vertical pieces secured together by the strips, E, whereby vertical movement of separate sections is avoided, as herein set forth for the purpose specified.

2d, The sections of the brood chamber constructed as described consisting of the removable frames, P P, blind frames, N N P, sides, Z, and sections, y, all arranged and described and sliding over the bottom guides, S, and between the triangular side strips, R, as herein set forth for the purpose specified.

68,142.—DEVICE FOR ATTACHING CHIMNEYS TO LAMPS.—Joseph B. Alexander, Washington, D. C.

I claim the S shaped lever, A, with its circular head working eccentrically upon the axle, D, and fitting exactly into the contraction of the chimney above the base rim, I, substantially as described, and for the purpose set forth.

68,143.—CAR SPRING.—T. F. Allyn, Nyack, N. Y.

I claim a car spring constructed of wood and rubber combined as described and set forth in my specification.

68,144.—MACHINE FOR MAKING MATCH SPLINTS.—Emery Andrews and William Tucker, Portland, Maine.

1st, We claim the compensating feed which is so constructed that the rack is fed down by the thickness of the card, the wave or feed bar being slotted so that the rack slides through it, the slats, b, being opened by the wedges, K, which are secured to the reciprocating head, E, substantially as described.

2d, The combination and arrangement upon the reciprocating head, E, of the feed plate, D, whose forward end pushes the cards through between the knives, C, and between the slats, b, of the rack, F, as herein set forth for the purpose specified.

3d, So arranging the knives, C, on the bars, a, that their cutting edges will be in a zig zag line for the purpose of decreasing the compression of the splint substantially as set forth.

4th, Providing the knives with concave cutting edges substantially as and for the purpose set forth.

68,145.—CIDER-MILL.—Robert C. Archibald, La Fayette, Ind.

I claim the double endless apron, L L, in combination with the rollers, K K', constructed and arranged to operate substantially as set forth.

68,146.—CARD BOARD DRIER.—E. F. Baily, Holdemess, N. H.

I claim the arrangement of the foraminous chamber or channels, the heating pipe or pipes, the carrier supporting frame or frame provided with inclined guides with each other and the air chamber at either end, and the box, A, constructed and provided with doors and a ventilator and valve thereto, substantially as described and for the purpose specified.

68,147.—TRACE BUCKLE.—R. J. Baker, Madison, Wis.

I claim the trace buckle when constructed and arranged as described consisting of the curved sides, a a, having pivoted at their centers upon the upper side by means of the crank arm, i, the bar, k, to the under side of which the pins, n n, are secured, said bar, k, adjusted to be raised or lowered by means of the crank arm, and when placed in the trace securely held in position by its rear end catching under the bar, h, and the pin, n, against the bars, c, as herein shown and described.

68,148.—BALE TIE.—Arthur Barbarin, New Orleans, La.

I claim the bail, A, when provided with the two encircling grooves, a and b, substantially as herein described for the purpose set forth.

68,149.—BALE TIE.—Arthur Barbarin, New Orleans, La.

I claim the ring, A, when constructed as herein described and shown upon the drawings, and used to fasten the end of wire rope, or wire, in banding cotton or other bales, substantially in the manner herein set forth.

68,150.—BUTT HINGE.—B. F. Barker, San Francisco, Cal.

1st, I claim the three leaf folding butt constructed substantially as herein shown and described the two forming a reversible hinge and acting alternately, substantially as set forth.

2d, I claim the plate, A, in combination with the butt, substantially as described.

3d, I claim the muffer substantially as described in combination with the butt as and for the purposes specified.

68,151.—SHEEP RACK.—J. S. Beals, Alabama Center, N. Y.

1st, I claim so hinging the boards, D and E, together and combining them with hinged cleats, d d, that a sheep rack can be formed with either an open or covered hopper, or one that is provided with a cover for the sheep and with an open feed rack, or which can be closed for the sheep if desired, as set forth.

2d, Extending the cleats, d d, so as to form supports for the boards, E E, and connecting the boards, D and E, at their edges, substantially as set forth.

3d, The boards, D and E, cleats, d d, revolving standards, B, and pieces, A, rails, a, and pins, c, in combination with each other, all made and operating substantially as herein shown and described.

68,152.—PLOW.—J. S. Beals, Alabama Center, N. Y.

1st, I claim making the opposite ends of the share, D, equal to each other, so as to provide the same with double cutting edges, a a, substantially as and for the purpose herein shown and described.

2d, Securing the share, D, to the lower portion of a bar, E, which is adjustable on standard, F, by means of set screw, c, substantially as and for the purpose herein shown and described.

3d, Securing the coulter, G, on the lower end of the same standard on which the supplementary share, D, is arranged, substantially as and for the purpose herein shown and described.

68,153.—COMBINED PEN AND ERASER.—W. F. Beaton, Philadelphia, Pa

I claim a combined reversible or invertible pen and eraser, constructed substantially as described.

I also claim the combination, substantially as described, of a combined pen and eraser, with a reversible holder.

I also claim the combination, substantially as described, of a combined pen and eraser, a reversible holder, and a shield, for the purposes set forth.

68,154.—FRAME FOR THE GLASSES OF CARRIAGE CURTAINS.—William F. Benton, Philadelphia, Pa.

1st, I claim, as a new article of manufacture, the glass and curtain holder, consisting of the concave convex plate, A, washer, D, and clips, B, constructed and arranged as described for the purpose set forth.

2d, Fastening glass in carriage curtains by clips secured to the frame and bent upon a washer, substantially in the manner described.

68,155.—WASHING MACHINE.—E. Beckwith, South Pass, Ill.

1st, I claim the manner herein shown and described of hanging the roller, E, in sliding bearings, a, between which it is held by the thimbles, e e, and rubber washers, f f, substantially as herein shown and described.

2d, The cylindrical or partly cylindrical wash tub, A, when provided with slotted head piece, C, and perforated partitions, F, in combination with the up and down adjustable oscillating or revolving roller, E, all made and operating substantially as herein shown and described.

68,156.—PAD CRIMP PRESS.—H. H. Beers, Toulon, Ill.

I claim a crimp or break for pads having an adjustable die, B, all made substantially as described.

68,157.—FILTER FOR REFINING SUGAR.—R. W. Bender, N. Y. City.

I claim the arrangement herein described for forcing the liquid through the animal coal by means of live steam, acting on the said liquid in a montejus, connected and combined with the filter or filters, substantially as set forth.

68,158.—PAINT CAN.—G. W. Bennet, New York City, assignor to himself, Geo. W. Peck and Chas. S. Bird.

1st, I claim the combination of the cross bar, B, having a screw hole formed through its central part with the upper part of the can, A, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the cover, C, having a groove formed in its lower side near its edge and having a screw, D, attached to its central part with the cross bar, B, and can, A, substantially as herein shown and described and for the purpose set forth.

68,159.—MEDICAL COMPOUND.—O. W. Blanchard, Delavan, Wis.

I claim the medical compound made of the ingredients and mixed together in or about the proportions substantially as and for the purpose described.

68,160.—HORSE HAY FORK.—C. D. Blinn, Port Huron, Mich.

1st, I claim the prong, A, constructed with a socket for the reception of the removable handle, B, substantially herein shown and described and for the purpose set forth.

2d, The combination and arrangement of the loop or ring, F, toggle, D, and ropes, C E G H, with each other and with the prong, A, substantially as herein shown and described and for the purpose set forth.

68,161.—CLOTHES PIN.—H. T. Boutell, Springfield, Vt.

I claim the two clamps, B, and the spring, C a, arranged and operating in the stock, A, as herein set forth for the purpose specified.

68,162.—MODE OF CLOSING BOTTLES.—T. S. Bowman, St. Louis, Mo.

1st, I claim the method of stopping bottles, substantially as described.

2d, The special constructing and combination of the bottle neck and stopple, B, substantially as and for the purpose specified.

68,163.—BRUSH AND TOP OF MUCILAGE BOTTLE.—William Burnet, New York City.

1st, I claim the use of a spring collar or washer on the handle of a mucilage brush.

2d, The use of the same in combination with a spring and the cap of a mucilage bottle.

3d, The use of a tubular rubber spring in combination with a mucilage bottle all made and operating as described, or their mechanical equivalents.

68,164.—NURSERY LOUNGE.—S. Buttenheim, New York City.

1st, I claim a combined lounge and night chair when made and operating substantially as herein specified and described.

2d, A combined lounge, night chair, and folding table when made and operating substantially as herein specified and described.

3d, A combined lounge, night chair, folding table and bureau, when made and operating substantially as herein specified and described.

4th, A combined lounge, night chair, folding table, bureau and writing desk when made and operating substantially as herein specified and described.

5th, A combined lounge, night chair, folding table, bureau and mirror, when made and operating substantially as herein specified and described.

6th, A combined lounge, and folding table, the latter being so arranged as to be concealed in a drawer, K, expanded or altogether removed from the lounge, as set forth.

7th, A combined lounge and mirror when made and operating substantially as herein specified and described.

8th, A combined lounge and writing desk, when made and operating substantially as herein specified and described.

9th, A nursery lounge when made and operating substantially as herein specified and described.

68,165.—CORN CULTIVATOR.—Andrew Canfield, Lyons' City, Iowa.

1st, I claim the adjustable extension guard to regulate the amount of earth applied to young corn.

2d, The raising levers, G G, in combination with the double stirrups, a a, for the purpose above set forth.

3d, The principle of raising and lowering a seat by means of a joint in the support of the seat when used substantially as and for the purposes above set forth.

68,166.—PORTABLE FENCE.—Peter Chandler, Olney, Ill.

I claim the combination of the keys or gibs, C, constructed as described

with the slotted posts, A A, and doubled battened panels, B B', of a portable fence as and for the purpose described.

68,167.—COTTON BALE TIE.—M. D. Cheek, Clarendon, Ark.

1st, I claim a cotton bale tie constructed in two parts with lapping ends provided with perforations in the one side and hooks on the other substantially as shown and described.

2d, The bars, G H, cylindrical upon the surface around with the hoop passed, in combination with the parts of a cotton bale tie as shown and described.

3d, A cotton bale tie constructed with lapping ends fitted as shown and provided with bars, G H, slits, I I, perforations, F F, and hoops, E E, for the purpose set forth.

68,168.—WRENCH.—T. D. Christopher, Madison, Ind.

1st, I claim the combination of the sliding thimble, D, the plate, E, the catch bar, F, and the spring, a, with a ratchet wrench substantially as and for the purposes set forth.

2d, I claim the same in combination with the screw, G, and nut, H, arranged substantially as shown and described on bar, e, of a ratchet wrench for the purposes set forth.

68,169.—HARROW.—Jacob Click, Springfield, Ohio.

1st, I claim constructing a harrow with a series of long curved and sharp-edged teeth or knives secured to a rotating shaft, so that they may be depressed to cut deeply into the ground, when desired substantially as and for the purpose set forth.

2d, A harrow constructed with the curved sharp-edged teeth, D D, and a series of long knife-shaped teeth, E, secured to the rotating shaft, F, provided with the levers, G G, by which said knives, E, may be depressed to cut deeply into the ground when desired substantially as set forth

3d, In combination with the shaft, F, and levers, G G, the pawls, J J, and ratchets, I I, substantially as and for the purpose set forth.

4th, In combination with the harrow, A, and the long seat, M, mounted thereon; the levers, G G, joined at their upper ends by the long connecting rod, N, as and for the purpose set forth.

5th, In combination with the harrow, A, the adjustable wheels, O O P, for the purpose of limiting the depth to which the teeth or knives may cut.

68,170.—FILTER FAUCET.—R. B. Coar, Jersey City, N. J.

I claim the handle, f, attached directly to one side of the larger end of the tapering hollow plug, d, in combination with the removable cap, e, and filtering diaphragm, h, all arranged as and for the purposes set forth.

68,171.—MACHINE FOR CUTTING BERRY BOXES.—Chas. Colby, South Pass, Ill. Antedated Aug. 18, 1867.

1st, I claim the cutting of strips for berry boxes by means of reciprocating frame, B, provided with the knife, C, the slitting or grooving cutters, c, bed, D, and the spur or trimming cutter, d, with the stop or transverse bar, E, or the frame, A, in which the frame, B, works all combined and arranged to operate substantially as and for the purpose set forth.

2d, I claim the bars, G G, fitting loosely on the shaft, F, and spiral springs, e, when constructed and arranged in such a manner that the said bars, G G, shall press the strips being cut against the under side of the knife as herein set forth.

68,172.—CHECK REIN HOLDER.—McDowell Darrow, (assignor to himself and O. W. Hart,) Gates, N. Y.

I claim in connection with the ordinary check rein and hook of harness, the rein holder, constructed and operating substantially in the manner and for the purpose herein shown and described.

68,173.—SEED DRILL.—H. V. Davis, (assignor to Chas. Richardson,) Amherst, N. H.

I claim the several parts marked, a b e f g n k, when the several parts are connected, arranged and operated as specified.

68,174.—WASH BOARD.—L. De Golia, Batchellerville, N. Y.

I claim a wash board provided with a wooden and a metallic corrugated surface, substantially as and for the purpose herein shown and described.

68,175.—AMALGAMATOR.—Geo. B. Field, New York City.

1st, I claim the arrangement and combination of the rollers, H H, with the segment amalgam chambers, A A, so that the former shall work back and forth in the latter to produce at the same time a crushing and grinding of the ores in the manner and for the purpose substantially as above set forth.

2d, The combination and arrangement of the vertical shaft, D, arms, G G, and hoppers, K K, and rollers, H H, working in chambers, A A, substantially as and for the purposes described.

3d, The arrangement of the amalgam chambers, A A, and setting chambers, B B, connected by the conduits, C C, substantially as described.

4th, The arrangement of the chambers, A A, with the chambers, B B, shaft, D, arms, G G, agitators, F F, hoppers, K K, and rollers, H H, substantially as specified.

68,176.—WASHING MACHINE.—T. G. U. Fisk, Macon City, Mo

I claim the piston, C', lever, D, and spring, E, in combination with the vessels A B, the whole being arranged and operated as described and set forth.

68,177.—FENCE.—Benj. Force, Mount Pleasant, Iowa.

I claim the diagonal braces, F, in combination with the stakes, A, riders, C, parallel bars, E and B, all arranged substantially as set forth.

2d, I further claim the battens, H, in combination with the stakes riders and bars, all arranged as shown and described.

68,178.—SMOOTHING IRON.—John Frasr, Dowagiac, Mich.

I claim the copper plate, B, in combination with a smoothing iron in manner and for the purposes substantially as described.

68,179.—RIDING ATTACHMENT FOR HARROWS.—Jas. M. Freeman, Bellville, N. Y.

I claim the connecting of a riding attachment to a harrow through the medium of the elastic bar, B, bolt, b, chain, d, and draft hook, c, all arranged substantially as and for the purpose specified.

68,180.—WINDOW SHADE.—F. Gesswein, Fond du Lac, Wis.

I claim, a blind or shade composed of slats with beveled edges arranged substantially as above described with notches in the edges of each slat where crossed by threads thereby weaving the slats closely together and narrowing the opening between them, and allowing the bevels of the edges to connect closely.

68,181.—DRYING BARRELS.—Samuel Gibbons (assignor to himself and G. E. Palmer), Binghamton, N. Y.

1st, I claim the within-described method of drying barrels by the heat radiating from pipes or equivalent means introduced into the barrels, substantially in the manner set forth.

2d, An apparatus for drying barrels composed of a series of pipes, A, with branch pipes, C, substantially as and for the purpose described.

68,182.—BALING PRESS.—J. H. Godwin, Scotland Neck, N. C.

1st. I claim the levers, E G, connected with the shoulders, f, and platen, H, in combination with the drop doors, I, springs, J, and buttons, k, substantially as described for the purpose specified.

2d, I claim the combination of the sliding thimble, D, the plate, E, the catch bar, F, and the spring, a, with a ratchet wrench substantially as and for the purposes set forth.

3d, The sides, h h' h'', hung to one post and door, m, in combination with the bar, g, cross bars, o o, drop catches, h, bars, n n, guide bars, r r, hinged bars, l i, and head block, c, substantially as described for the purpose specified.

3d, The screw nut in combination with the upper hinge to prevent the dragging of the doors, as herein set forth.

4th, The combination of the head block, C, supplemental door, s, and button, t, substantially as described for the purpose specified.

5th, The combination and arrangement of the frame, A, having stout plates, b, levers, E G, connected by shoulders, f, doors, h h' h'' and m, and supplemental door, s, catches, h, cross bars, O O, bars, n n c, button, t, head block, C, drop doors, I, springs, J, and buttons, K, bar, g, guide bars, r r, and hinged bars, l i, substantially as described for the purpose specified.

68,183.—SADIRON.—James Gray, Newark, N. J.

1st, I claim the solid iron, A, when provided with a lug or lugs, a, in combination with the shield, B, having a bolt or bolts, C, and fitted to the handle supports, D, as described.

2d, The flanges, b and c, or either formed respectively on the surface of the solid iron, A, and on the underside of the shield, B, form an air chamber, as set forth.

68,184.—VEGETABLE CUTTER.—Victor Hagmann, Washington, D. C.

1st, I claim a device for cutting vegetables, etc., having one or more knives attached to a screw adapted to receive a rotary and progressive motion, substantially as described.

2d, The combination with a screw, A, bearing one or more knives of the spring jaw, D, for holding said screw to its threaded bearing and permitting its ready retraction, substantially as described.

68,185.—RING FOR SPINNING.—H. G. Hall, Fayetteville, N. C.

I claim the rings, B C, constructed as described, the former provided with the eccentric flange, a, fitting into the rail and the latter with a similar eccentric flange fitting within the ring, B, when both are constructed to operate as set forth and held in position by means of the set screws, b c, substantially as described for the purpose specified.

68,186.—ROTARY STEAM ENGINE.—S. G. Hall, Norwich, Ct.

I claim the L-shaped pieces of the piston, B, provided with grooves, d, and tongues, c, operating in combination with the piston, B', provided with recesses, b, when applied to the piston wheel, C, and irregular cylinder, A, all constructed as and for the purpose described.

68,187.—DIE FOR FORMING THE EYES OF PICKS.—Henry M. Hamilton, New York City.

I claim the combination of the improved jaws, A A', a divided cutter ring, C (either at the upper or lower side), and shouldered punch, E, operating substantially as described.

68,188.—FUMIGATOR FOR DESTROYING VERMIN.—Jonathan R. Hamilton, M. D., Portland, Oregon

1st, I claim the cup or bowl, A, with its insulated chamber, H, and pipe, D, as constructed with stopper, E, in combination with the apparatus E, or its equivalent, for operating substantially as and for the purposes herein specified.

2d, I claim the pipe, D, as constructed with the end closed and side openings, e e, for the escape of the fumes when said pipe is constructed with a chamber having an inside coating of calcined plaster or other suitable material as a non-conductor of heat as described and for the purposes herein set forth.

68,189.—CURTAIN FIXTURE.—Oscar Hanks, Cincinnati, Ohio.

I claim the elastic adjustable grooved pulley, E, in combination with elastic collar, F, as applied to certain rollers, C, substantially as described.

68,190.—GRAPE PLOW.—Richard Hardenbrook, Bath, N. Y.

I claim the clevis, H, provided with the elongated slot, h, perforated arms or fork, h' h', and lip, e, when connected to the notched beam, A, by means of the single pivotal bolt, substantially as and for the purpose described.

I also claim the curved form of the slot, h, or the equivalent thereof, whereby a forward inclination is given to the draft-bearing surface of the clevis from the center to the ends thereof, substantially as described.

I also claim the flanged extension or tail piece, A', formed on the beam, A, as a means of attachment of the handles, B B, as described.

68,191.—SHEEP RACK AND MOW COMBINED.—John Harman, McConnellsville, Ohio.

I claim the construction and combination of the rack, A, and mow, B, and opening, C, as herein described and for the purposes set forth.

68,192.—SASH WEIGHT.—Sandy Harris (assignor to himself and David Bevan), Philadelphia, Pa.

I claim the mode or modes, substantially as herein described, of attaching the sash cord to the weight.

68,193.—ELEVATING BLOCK.—Wm. H. Hawley, Utica, N. Y.

I claim the pulley, D, substantially as described, in combination with the chain, E, and stop, G for the uses and purposes mentioned.

68,194.—BUCK-SAW FRAME.—H. M. Hawyard, Boston, Mass.

I claim the improved saw straining mechanism as described or in other words the combination and arrangement of the teeth, a b, with the cam, E, and its bearing plate, C, when combined with the lever, F, and its connecting rods, or the equivalent thereof, the whole to be applied together and to a saw frame, as specified.

68,195.—HORSE HAY FORK.—J. S. Henry and A. H. Rust, Manheim, Pa.

We claim the arrangement of the notched lever, G, in combination with the spring bolt, K H, for operating the point, E, by a connecting lever, D, between the parallel bars, A A', all combined and operating in the manner and for the purpose specified.

68,196.—SEWING MACHINE.—W. S. Hill, Manchester, N. H.

1st, I claim the combination of the needle arm, E, constructed as described with the sliding pin, d', and cam, k, substantially as and for the purpose specified.

2d, The needle rod, E, and its grooved cam plate, J, for operating the looper, substantially as described.

68,197.—DEVICE FOR CATCHING ANIMALS.—W. L. Hopper, Monmouth, Ill.

I claim the sliding bar, C, in combination with the parts, A B, and spiral spring, s, substantially as described for the purpose specified.

68,198.—APPARATUS FOR AGITATION OF MILK IN CHEESE VATS.—J. Carroll House, Lowville, N. Y.

I claim the use of the compound vibrating rotary dasher, D b F C E, with the pulley, G, crank, e, together with the crank pulley, H, and their connections, as and for the object herein specified.

68,199.—CARRIAGE CURTAIN FIXTURE.—Edward Howell, Ashtabula, Ohio.

I claim the cam, c, and thumb piece, E, pivoted to the cam and arranged in relation to the rib, d, and curtain, substantially as and for the purpose set forth.

68,200.—PLOW CLEVIS.—Hanford Ingraham, Naples, N. Y

I claim the clevis as constructed substantially in the manner and for the purpose as herein set forth.

68,201.—COMBINED CORN PLANTER AND CULTIVATOR.—D. W. Jacoby, Shelbyville, Ill.

1st, I claim the stationary plate, P, substantially as described.

2d, The combination of the stationary plate, P, having a mortise or groove in which a slide plate, O, is made to operate by means of a spring, h, rods, m, and crooked lever, n, in combination with pipe, R, substantially as set forth.

3d, The combination of the shovels, F' F, pipe, R, plates, O P, spring, h, lever, n, rods, m v, arranged to operate substantially as and for the purpose set forth.

68,202.—GRIDDLE.—Edwin A. Jeffery (assignor to himself and George M. Clark), Trappe, Md.

I claim the combination of the rim, C, fixed plate, B, hinged plate, A, having recesses, D, constructed substantially as described for the purpose specified.

68,203.—VENEER CUTTER.—Edward Jewett, Rindge, N. H.

I claim the face beveled knife, C, when combined with the head block, B, and arranged with relation to the friction plate, D, as and for the purposes set forth.

68,204.—BUCKLE.—W. B. Johnson, Bowling Green, Ky.

I claim an improved buckle having its tongue held by means of a spring, substantially as and for the purpose described.

68,205.—MAGNETIC MACHINE FOR SEPARATING IRON FROM BRASS TURNINGS AND FILINGS.—Julius Jonson (assignor to Gustavus Jonson and H. L. Frank), Baltimore, Md.

1st, I claim the arrangement of the helices, G G, magnets, H H, wires g g, and rods, i k, in connection with the plate, O, and the plate, P, substantially as and for the purpose described.

2d, I claim the arrangement of the magnets, H H, with their faces in a position inclined obliquely across their direction of revolution, substantially as and for the purpose specified.

68,206.—CASTING BELLS.—Andrew Jusberg, Galva, Ill.

I claim forming bells of copper, tin and silver, in the proportion substantially as described.

68,207.—HARVESTER PITMAN.—W. J. Keeney, Florence, Ind.

I claim the dotted adjustable box, C, constructed as described, its outer concave end fitting and working against the outer convex side of the hook, b, of the sickle bar its inner end secured to the pitman, A, as herein set forth for the purpose specified.

68,208.—WATCH KEY.—O. P. Kingman, Bridgeport, Conn.

1st, I claim a watch key rotating axially in a collar oscillating on trunnions, substantially in the manner described for the purposes set forth.

2d, The combination of the axially rotating key, the swinging collar, the half link or loop, and the swivel, C, for the purpose of winding up the watch with a key attached to the watch itself by a short link and of protecting the key when not in use.

3d, The notch, i, in the barrel for the removal of obstructions, as set forth.

68,209.—BROOM HEAD.—Isaac Kohn, Edgerton, Ohio.

I claim the leaf, A, flange, C, and loop, c', arranged in relation to the hooks, D, teeth, E, and case, as and for the purpose substantially as specified.

68,210.—STEAM HEATING APPARATUS FOR BREWERS AND OTHERS.—A. Komp, New York City.

I claim the arrangement of a series of small nozzles, a, in combination with the steam heating drum or pipe, A, substantially as and for the purpose described.

68,211.—WASHING MACHINE.—A. F. Kuhlman, Dubuque, Iowa.

I claim, 1st, The combination of the smooth rubbers, D, and inclined rubbing and feed boards, E, with the vibrating arms or plates, C, and shaft, B substantially as herein shown and described and for the purpose set forth.

2d, The pivoted stuffers, F, in combination with the inclined feed boards, E, vibrating arms or plates, C, and tub, A, substantially as herein shown and described and for the purpose set forth.

3d, The combination of the pivoted guard board, G, or equivalent, with the stuffers, F, and vibrating arms or plates, C, substantially as herein shown and described and for the purpose set forth.

68,212.—MODE OF DRIVING PRINTING PRESSES.—Clark M. Langley, Lowell, Mass.

I claim the spring, B, which retains the shipper bar and driving belt in any required position in combination with the cord, L, the shipper box, O P, and the double cones, substantially as herein described.

68,213.—COAL HOD.—James A. Lawson, Troy, N. Y.

I claim a coal hod or scuttle having its body in the general form of a frustrum of a cone and provided with a hopper, all substantially as and for the purpose specified.

And I also claim the bale when combined with the body of the scuttle by means of hinged joints and stops, substantially as and for the purpose specified.

68,214.—CENTRIFUGAL PUMP.—N. H. Libby, Charleston, S. C.

I claim the head plate, B, provided with lugs, D, in combination with the catches, E, shaft, C, drum, F, and clutches, H I, substantially as described for the purpose specified.

68,215.—VISE.—John Lee (assignor to Isaac C. Tate), New London, Conn.

I claim, 1st, The stationary jaw, A, when provided with a flange, a, as and for the purpose specified.

2d, In combination with the above a sliding jaw when the same has a tongued shank fitting in grooves arranged on the arms of the stationary jaw, said arms being fitted to the under side of the bench, substantially as described for the purpose specified.

68,216.—PORTABLE CRANE FOR LOADING WAGONS.—Amos Leitner, Hopewell Township, Ohio.

I claim, 1st, The combination of the lever, E, connecting bars, O and N, and sliding bar, P, with each other and with the hinged bearing, M, of the pinion shaft or axle, G, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the lever, S, connecting bars, T, and cross bar, U, with each other, with the sliding bar, P, and with the slotted end of the arm or beam, a2, substantially as herein shown and described.

3d, Actaching the tines v1, to the cross bar, v2, of the fork head, substantially in the manner herein shown and described.

4th, The combination of the scoop, W, with the lines, v1, and cross bar, v2, of the fork, V, substanially in the manner herein shown and described and for the purpose set forth.

68,217.—ELLIPTIC SPRING.—E. C. Lewis, Auburn, N. Y.

I claim the nibs formed upon the inner sides of the ends of the leaf, B, fitting into the grooves upon the upper side of the leaf, A, in such a manner as to keep the leaves in line with each other and preventing their lateral displacement, said nibs and grooves formed without having any corresponding depression or projection upon their opposite sides of the leaves, as herein described for the purpose specified.

68,218.—DEVICE FOR ELEVATING ICE.—Henry Little, Middletown, N. Y.

I claim, 1st, The curved platform, E, applied to the screw elevator, substantially as and for the purpose set forth.

2d, The movable bar, G, applied to the frame of the device when used in connection with the screw elevator, substantially as and for the purpose specified.

68,219.—PERMUTATION LOCKS.—Calvin L. Lucas, Plymouth, Mass.

I claim in combination with the tumbler and the superposed bolt plate, when guided by the arbors of the permutation gear as described of the crank or locking pin, k, under the arrangement and for operation as herein shown and specified.

68,220.—BED SPRING.—Geo. B. Markham, Plymouth, Mich.

I claim the spring composed of two wires, A A, having springs, B, coiled upon their length each passing through an eye, a, in the other and finished off by the loop or eye C, in manner and for the purpose substantially as above set forth and described.

68,221.—COMPOUND TO BE USED IN BEEHIVES.—T. F. McCafferty, Forest, Ohio.

I claim the compound made of the ingredients substantially as and for the purpose specified.

68,222.—MACHINE FOR MAKING SPIKES.—R. G. McKay, Cleveland, Ohio.

1st, I claim the cutting pointing and griping die, D, bed die, D', header, K, and spring, k, all constructed and arranged as and for the purpose set forth.

2d, The sliding cam, H, header, J, and springs, P e, in combination with the dies as and for the purpose described.

3d, The described arrangement of the rollers, R, lever, W, cam, V, spring, s, pawl and ratchet for the purpose specified.

68,223.—SNAP HOOK.—C. H. Miller (assignor to himself and T. W. Toye, and E. L. Cook,) Buffalo, N. Y.

I claim the tongue, C, extended below its fulcrum bearing to form the buckle tongue, D, in combination with the loop, B, thereby forming a snap hook and buckle substantially as described.

2d, Hinging the tongue of a snap hook to the shank thereof by means of the pin c1, and the brace or bearing a2 both constructed and combined substantially as herein set forth.

68,224.—MACHINE FOR FILLING RUTS AND LEVELING ROADS.—J. W. Minor, and D. P. Ward, New Bedford, Mass.

1st, We claim the combination and arrangement substantially as described of the guide wheel, B, the counters or shares, a a, the scrapers, b b, the lever, I and the roller, F, substantially as and for the purpose herein shown and described.

2d, We claim the scrapers, b b, in combination with the roller, F, arranged substantially as described with or without the guide wheel, B, and the coulters, or shares, a a.

68,225.—COTTON BALE TIE.—S. J. Mitchell, St. Louis, Mo.

I claim a cotton bale tie formed of a metal plate, A, having a slot, a, nearly across it and the pins, c c', on the wings, d d', constructed and operating as herein specified.

68,226.—SLEIGH BRAKES.—H. F. Morton, West Sumner, Me.

I claim the guides, D, mounted upon a suring on either side of the sled having both ends free, the lower arm being sufficiently long to reach the ground and kept off it by the elasticity of a spring, C, substantially as shown and described.

68,227.—GRAIN RAKE.—Earl Palmer, Solon, N. Y.

I claim the axle, B, constructed as destribed in combination with the clasp, H, and spring, K, substantially as and for the purpose set forth.

2d, The clasp or binder, H, with the spring, K, and hasp, L, attached to the axle and working in conjunction therewith and the fingers, f f f, as described.

3d, The axle, B, bent at its center as described in combination with the rake sections, D D, independent of each other and arranged to operate substantially as and for the purpose set forth.

68,228.—STUMP EXTRACTOR.—Isaac H. Palmer, Lodi, Wis.

1st, I claim the combination of the pivoted standards, A C, wheels, B, E, arranged and operating substantially as herein described.

2d, The pivoted standards, A C, wheels, B E, and chains, G e, arranged substantially as described for the purpose specified.

68,229.—PLATE WARMER.—J. C. Palmer, New York City.

I claim a plate warmer so constrrcted and operating as to present the plate edgewise to the heater register substantially as and for the purposes described.

I also claim so constructing a plate warmer that it can be applied either to a register in the floor or one in the wall by merely shifting its position, substantially as described.

68,230.—LIFTING JACKS.—J. N. Parker, Darlington, Wis.

I claim the standard, A, to which the lever, B, provided with the head, B', covered with a roughened iron band, d, is pivoted by a knuckle joint, a, all constructed and arranged as described and adapted to be supported upon the graduated block, C, as herein shown and represented.

68,231.—CARBURETING APPARATUS.—G. H. Peacock, Fairport, N. Y.

1st, I claim a reservoir or tank for liquid hydro carbons in combination with a vessel through which air or gas etc., is forced or passed in any suitable manner when the two are so connected as to enable a uniform or even hight or nearly so of liquid to be maintained in the latter or air or gas vessel substantially as described for the purpose specified.

2d, In combination with the above, so arranging the supply tank or reservoir that it can be adjusted for maintaining a greater or less hight, or nearly so, of liquid, within the generator vessel, substantially as and for the purpose described.

3d, So arranging a pipe or tube, or tubes, within the supply tank, which pipe or pipes connect with the tube or other combination between the said tank and the generator vessel, as to take the liquid in the tank, both from a point at or near its surface, and at or near its bottom, substantially as and for the purpose specified.

4th, The combination of the tank, A, vessel, H, and coil of pipe, G, connecting the two, substantially as and for the purpose described.

5th, The arrangement of the air pipe within the generator, H, in combination with the chamber communicating with such generator, substantially as and for the purpose specified.

62,232.—FLOATING FENCE.—J. Pitcher, Mount Vernon, Ind.

I claim, 1st. The combination of the panels, A, hoops, B, and stakes, C, or their equivalents with each other, substantially as herein shown and described, and for the purpose set forth.

2d, In combination with the above I claim the cables, E, posts, D, substantially as described, for the purpose specified.

68,233.—ROLLS FOR ROLLING RAILROAD RAILS.—Samuel L. Potter, Wyandotte, Mich.

I claim the fillets, or shoulders, h h, formed in one or more of the rolls, and in any desired number of grooves therein, so as by pressure upon the rail to cause the steel to become prominent, substantially as and for the purpose described.

68,234.—BARREL OR CASK.—C. T. Provost, N. Y. City.

I claim dividing the interior of a barrel, keg, or cask, into two or more compartments, by means of partitions arranged within the barrel, substantially as and for the purpose herein shown and described.

68,235.—WATER GAGE FOR STEAM GENERATORS.—Emmett Quinn, Washington, D. C. Antedated July 1, 1867.

I claim, as a new article of manufacture, a water gage, consuting of the metal frame, with the glass plates, B, secured thereto on opposite sides, as herein shown and described.

68,236.—PAPER BINDING.—W. P. Read, Longmeadow, Mass

I claim a paper-fastener, composed of the strip, A, arranged and constructed substantially as and for the purpose described.

68,237.—SWINGLE-TREE.—Martin Ryerson, Huntsville, Ala.

I claim a swingle, tree, constructed of iron rods, a a, in a barrel form, bound together and supported by disks, b, and bi, bi, and arranged and applied substantially as herein described.

68,238.—HOOP SKIRT.—Wm. S. Ryerson, Philadelphia, Pa.

I claim a hoop or skeleton skirt, having its tapes secured to the waist band or belt, in combination with buckles at such point of attachment through which the said tapes pass, substantially as and for the purpose described.

68,239.—STEAM DRYING APPARATUS.—William Ryner, Philadelphia, Pa., assignor to himself and J. C. Hopewell, Flemington, N. J.

I claim, 1st, The center pipe, C P, steam cocks, S C, and openings, H, the whole constructed and operating in the manner and for the purpose above set forth and described.

2d, The sets of steam pipes, U S, and U' S', with escape steam pipe, T T, and discharge holes, H H H H, connected with fire house, A, by pipe, P M, the whole constructed and operating in the manner and for the purpose above set forth and described.

68,240.—WOOL PACKERS.—Absalom Saeger, Meadville, Pa.

I claim the construction of the rack cylinder, fig. 5, in combination with the hoop, W, constructed with its outer end leveled, and larger than its inner end, in combination with the packing cylinder, A, the follower, K, the pin, S, the racks, B, and the gear wheels, D and E, the rollers, 6 7 8 9, when the same are constructed as described in the aforesaid combination, and for the purposes set forth.

68,241.—JACK SCREW.—Charles H. Sawyer, Saco, Me.

I claim the jack screw, combining the different parts herein described, arranged and to operate as set forth.

68,242.—MASH AND BEER COOLER.—C. Schenck, Manheim, Grand Duchy of Baden.

1st, I claim a liquid cooler, so constructed that, by centrifugal power, the liquid is thrown from a revolving disk against the inside of a revolving cylinder, where it is cooled by a current of air created by a fan on the inside of the cylinder, substaantially as herein shown and described.

2d, The cylinder, F, in combination with the disk, L, on the shaft, J, and with the fan, M, all made and operating substantially as herein shown and described.

3d, The above, in combination with the annular vessel, P, the same being made as set forth.

68,243.—STRAW CUTTER.—W. Schreck, Des Moines, Iowa. Antedated Aug. 23, 1867.

1st, I claim the sliding frame, F, working in the vertical standards, C C, in combination with the pitman, f, the reciprocating feed box, H, the spring rod, p, and the feeder, s, arranged and operating as and for the purposes herein described.

2d, The flap, m, in the bottom of the feed box, H, in combination with the spring, n, arranged and operating as and for the purpose specified.

68,244.—PRESSING BRICK.—Oran W. Seely, Buffalo, N. Y.

I claim the pressing of bricks, by means of two perforated pistons, acting simultaneously on both sides, substantially as described.

68,245.—INSTRUMENT FOR MEASURING DRY GOODS.—Thornton, A. Shrim, Baden, Pa.

I claim the large wheel, with the fractions of the yard or foot marked thereon, in combination with the ratchet wheel, L, carrying the hand, N, which registers the number of yards or feet on the dial, M, together with the spring and slide, carrying the small friction wheel, F, constructed substantially as and for the purpose set forth.

68,246.—CIDER MILL.—Thornton A. Shrim, Baden, Pa.

I claim the disk, E, constructed and arranged substantially as described, in combination with the rollers, J K L and M, when arranged and operating as described, and for the purpose set forth.

68,247.—DOUBLE SHOVEL PLOW.—L. L. Sloss, near South Union, Ky.

I claim connecting the plow frames to each other, by the three adjustable bars, D E F, not in the same horizontal plane, and pivoted or connected at end to the plow frames, by double jointed, hinged or equivalent connections, so as to have both a lateral and vertical movement, substantially as herein shown and described, and for the purpose set forth.

68,248.—CRUSHING AND WASHING SAND.—John R. Smith, Connellsville, Pa., assignor to himself and W. H. Denniston, Pittsburg, Pa.

1st, I claim the introducion of a stream or flow of water, into the crushing pan ot a revolving sand, rock, or sand stone crusher, to aid the crusher or crushers in disintegrating the rock, and to cleanse and discharge the pulverized sand, substantially in the manner and for the purposes hereinbefore set forth.

2d, The rotating and revolving crushing wheels, b, in a sand rock crusher, in combination with a crushing pan, a, provided with a discharge gate, s, and a water supply pipe, h, or its equivalent, all constructed and operated substantially as and for the purposes above set forth.

68,249.—VALVE FOR WATER CLOSET.—W. Smith, San Francisco, Cal.

I claim the vale, H, working through the annular elastic washer, i, whereby in opening the valve the water in the chamber is allowed to pass freely, said washer preventing the return of the water, excepting through the channel, h, as herein set forth, for the purpose specified.

68,250.—CARTRIDGE RETRACTOR FOR BREECH-LOADING FIREARMS.—William S. Smoot, Washington, D. C., assignor to Windsor Manufacturing Company, Windsor, Vt.

I claim a cartridge extractor swinging loosely on a common center, with that of the carrier or breech block, when said extractor, after being gradu-

ally operated by swinging the said block, is made to take on, by any means, a suddenly accelerated movement to extract the shell, without accelerating the movement of the block itself, by which the extractor is operated.

68,251.—SWIVEL SHIP FENDER.—W. Sniffin, Sing Sing, N. Y.

I claim the combination of the swivel, a, with the fenders, A, substantially as and for the purpose herein shown and described.

68,252.—WAGON JACK.—J. M. Spitler, Clinton, Kansas.

I claim the lifting bar, B, provided with ratchet teeth, a a, in combination with the forked handle, C, and catch loops, c c, the springs, d d, and the slide, D, arranged and operating as and for the purpose described.

68,253.—PLOW.—Wm. T. Sprouse, Chandlerville, Ill.

I claim the landside, b, when constructed in the manner herein shown and described.

78,254.—PROCESS TO BE USED IN THE MANUFACTURE OF GLASS, SOLUBLE SILICATES, HYDROCHLORIC ACID, AND BLEACHING POWDERS.—Wm. R. Stace and H. M. Baker, Rochester, N. Y., assignors to themselves, John A. Morrison, Seward F. Gould, and Joseph Eastwood.

What we claim is the application to the manufacture of glass, soluble silicate of soda, bleaching powders, and hydrochloric acid, of the processes herein described, for the decomposition of chloride of sodium with silicic acid and oxygen gas, at elevated temperatures, whether said oxygen gas be furnished in the manner herein described (from steam or air), or from chlorate of potash, peroxyde of manganese, caustic baryta, or any other of the usual modes.

68,255.—BEDSTEAD.—W. B. Stewart, Brooklyn, N. Y.

What I claim is the bars, f and g, fitted as specified, in combination with the rollers, d d i and k, carrying the racking or webbing, e and m', as and for the purposes set forth.

68,256.—GRATER.—Henry Stone, Williamsburgh, N. Y.

I claim a grater consisting of box, A, grating cylinder and drawer, all constructed and combined together substantially as described.

68,257.—APPARATUS FOR DISTILLING AND RECTIFYING PETROLEUM.—Charles Stoll, San Francisco, Cal. Ante-dated Aug. 19, 1867.

1st, I claim an apparatus for distilling and rectifying petroleum, in which steam is used in the still or retort and rectifier, substantially as and for the purpose described.

2d, The rectifier, E, together with the endless coil, G, the coils, H and M, and the returning pipe, T, substantially as and for the purpose described.

68,258.—REFRIGERATOR.—Anthony B. Sweetland (assignor to himself and J. Daley), Fitchburg, Mass.

1st, I claim the ice bottom, D, when provided with legs, d', projecting through the inclined lining, C, and resting upon the bottom of the case, A, as herein set forth for the purpose specified.

2d, The air passages, a, formed upon the sides of the metallic lining, B, whereby the air entering the bottom at o passes through the perforations, d, to the revolving shelves, g, as herein shown and described.

3d, The construction and arrangement of the perforated metallic lining, B, having inclined bottom, C, and provided with side air tubes, a, and central cross bar, f, supporting the movable shelves, g g, and removable perforated bottom, D, all incased by the wooden casing, A, as herein set forth for the purpose specified.

68,259.—DUST BRUSH.—Ellis Thayer (assignor to himself and George W. Thayer), Worcester, Mass.

1st, I claim the reversible sliding block, B, of a dust brush, when arranged on the grooved or tongued handle, A, in the manner set forth, and when itself tongued or grooved, substantially as herein shown and described.

2d, The reversible sliding block, B, of a dust brush, in combination with the handle, A, and spring, D, all made and operating substantially as and for the purpose herein shown and described.

68,260.—REMEDY FOR SPAVIN IN HORSES.—Stephen E. Thayer, Manchester, Vt.

I claim a medicine compounded of the ingredients in the manner and for the purposes herein specified.

68,261.—PROCESS OF PREPARING PAPER PULP FROM STRAW AND OTHER MATERIALS.—Joel Tiffany, Albany, N. Y.

1st, I claim the above described process consisting in preparing the stock, charging the boiler, exhausting the air therefrom, resting in the boiling liquor, using pneumatic pressure, and boiling the stock, in combination with the use of any caustic boiling liquor, substantially in the manner and for the purpose above described.

2d, I also claim the use of the within described bleaching process, in combination with the above described process of preparing the stock for bleaching, substantially in the manner and for the above described purpose.

68,262.—COTTON SEED PLANTER.—J. C. Tobias, Helena, Ark.

1st, I claim the revolving toothed wheel, D, and revolving toothed shaft, F', placed within the hopper, A, in combination with the adjustable elastic plate, F, underneath the bare plate of the hopper, substantially as and for the purpose set forth.

2d, I further claim the beam, G, in combination with the hopper, A, mounted on wheels, B B, and connected together substantially as and for the purpose specified.

3d, I also claim the pressure or covering bar, I, in combination with the harrow, G, and the hopper, A, provided with the seed distributing device, all constructed and arranged to operate in the manner substantially as and for the purpose set forth.

68,263.—GRINDING MILL.—Chas. T. Umfried, Stuttgart, Würtemburg.

1st, I claim the adjustable standards, s, to which the open bed stones are secured, having channels, t, and funnels, g, supporting the traverse, h, for the purpose described, substantially as specified.

2d, Conveying the grain to the stones by means of the channels, t, in the adjustable standards, s, substantially as described.

3d, The grinding mill the parts of which consist of the bed stones, a, runner, b, adjustable standards, s, traverse, h, and vibrating conveyor, k, when constructed, arranged, and operating substantially as represented and described.

68,264.—ROOFING COMPOSITION.—Wm. Van Dyke and W. W. Eastwick, Keokuk, Iowa.

I claim a fire and water proof paint which is composed of the several substances mixed together in about the proportions described.

68,265.—SHIP VIAMETER.—Jas. C. Walker, Waco Village Texas.

I claim the combination in a viameter of the pipes, A and C, wheel, B, circular box or sheath, D, and indicating apparatus, substantially as and for the purpose described.

68,266.—PILE FOR WROUGHT IRON BEAMS OR GIRDERS.—George Walters and Thomas Shaffer, Phœnixville, Pa.

We claim a pile or fagot for wrought iron beams or girders, composed of one or more bars for the nib, and any appropriate number of bars for the flange or flanges, when the said bars are arranged and permanently secured together by bolts or rivets, as and for the purpose herein set forth.

68,267.—PILE FOR WROUGHT IRON BEAMS OR GIRDERS.—G. Walters and T. Shaffer, Phœnixville, Pa.

I claim a pile or fagot for wrought iron beams or girders, etc., composed of one or more bars for the web, and three or more bars for each flange, when the said bars are arranged and permanently secured together by bolts or rivets, as and for the purpose described.

68,268.—SPRING BED BOTTOM.—Otis H. Weed, Charlestown, Mass.

I claim the slats, C, so lengthened as to rest upon the springs, b or c, and extending the whole length of the bedstead, in combination with the springs, b or c, passing over the rail and supported by the same, to which they are attached by means of the removable and detached plates, a, all substantially as described and for the purpose set forth.

I also claim attaching the springs of the bed bottoms to the rails by means of the removable and detached plates, a, substantially as described.

68,269.—REFRIGERATOR.—John De W. Wemple, Albany, N.Y.

I claim the combination and arrangement of reservoir, W, filter, H, ice chest, I, trough, O, and faucet, F, as and for the purpose specified.

68,270.—WASHING AND WRINGING MACHINE.—James Whitney, Bristol, Vt.

I claim the combination of the tub, A, sliding frame, E, rubber springs, F, fluted cylinders, B C, wringer, G, constructed as described, and the table leaf, N K O and P, as herein set forth for the purpose specified.

68,271.—STRAWBERRY TRELLIS.—Wm. W. Wilcox, Middletown, Conn.

I claim the strawberry trellis, a, made substantially as above described, with an upright post or posts, e, and branching arms, c.

68,272.—CORN HUSKER.—Daniel Williams, Saginaw City, Mich.

I claim the construction and arrangement of the cutting plate, G, upon the pivoted bar, C, notched and flanged plate, H, upon the interior stationary frame, D E A, constructed and operating as herein shown and described.

68,273.—CHURN.—Samuel C. Wilson, Olney, Ill.

1st, I claim the arrangement of the dash rod, B', cross bar, E, shaft, J, crank wheels, H H, connecting rods, I I, pulleys, L M, and band, K, substantially as and for the purpose explained.

2d, The dasher consisting of the annulus, N', and convex-concave deflector, N, substantially as described.

68,274.—SHAFT COUPLING.—Thos. H. Wood, Monroeville, O.

I claim the spring, D1, section of the reach, D, and pivots, C, pivoted with nibs, E, as arranged in combination with the lugs, B, and clip, A, for the purpose and in the manner set forth.

68,275.—WASHING MACHINE.—John Worden, Normal, Ill.

I claim the combination of the beater, G, having the bars, g1 g2, lever, F, tub, A, with vertical ends, a1, inclined sides, a2, curved bottom, a3, and discharge orifice, I, sliding, wedge-shaped gate, D, having rubber or equivalent plate attached to its inner side, all constructed and operating substantially as herein set forth for the purpose specified.

68,276.—MILK HOUSE.—Henry Yerty, Covington, O.

I claim the within described milk house, constructed substantially as and for the purpose specified.

68,277.—GANG PLOW.—G. C. Avery, Conn's Creek, Ind.

I claim the hinged levers, D D, vertical bars, G G, loops, a a, cords, g g, and lever, H, the whole combined and operated substantially as and for the purpose herein set forth and described.

68,278.—LAMP SHADE.—D. W. Bashore, Palmyra, Pa.

I claim the narrow shade, B, with reflecting inner surface so constructed as to rest upon and closely surround the bulb of a lamp chimney with its upper opening large enough to not materially obstruct the ascending rays of light.

68,279.—CHEESE-CURD CUTTER.—William A. Bemis, Spencer, Mass.

1st, I claim the employment of the double-edged knife, G, in combination with the sliding frame, A, as and for the purpose set forth.

2d, The employment of the boards, E E, in combination with frame, D, and knife, G, all arranged to operate in connection with box, A, as and for the purpose specified.

68,280.—HEDGE TRIMMER.—Friederich Binder (assignor to himself and William Richardson), Baltimore, Md.

I claim the straight-edged single blade, A, operating in combination with the straight-edged double or slotted blade, B, substantially as and for the purpose described.

68,281.—PERMUTATION LOCK.—Ed. W. Bretell, Newark, N.J.

1st, I claim the wheel, W, the stumps, s1 and s5, the recess, R1, and cap, K, with its stumps, s1 and s2, as shown in fig. 1, pl. 2, and fig. 2, pl. 1, when arranged in the manner and for the purpose herein set forth.

2d, I claim the lever, L, with recess, R2, and check, c1, as shown in figs. 1 7, pl. 2, substantially in the manner and for the purpose herein set forth.

3d, I claim the cross bar, I, with its stump, s3, also the tumbler, T, as shown in figs. 1 and 2, pl. 1, in the manner and for the purpose herein set forth.

4th, I claim the swiveling dog, G, and the claw socket, L, as shown in figs. 1 and 2, pl. 1, and figs. 5 and 6, pl. 2, when arranged in the manner and for the purpose herein set forth.

68,282.—BALING SHORT CUT HAY, ETC.—Charles Brown, Buffalo, N. Y.

1st, I claim pressing and binding short cut hay and straw into compact bales as a new article of manufacture, trade, and commerce, substantially as described.

2d, The application and use of straw or hay as a binder on the top and bottom of the bale, substantially as set forth.

68,283.—HORSE RAKE.—E. W. Bullard (assignor to himself and J. W. Jenkins, Jr.,) Barre, Mass.

1st, I claim the combination with the arms, I and p, of the guide piece, J, hook, K, and holding and revolving piece, 9, substantially as and for the purpose set forth.

2d, The combination with the arm, J, and flanged hub, M, of one or more forks, 10, substantially as and for the purposes set forth.

3d, The combination with the hooks, K, and suitable mechanism for operating the same, of the flanged hub, M, and the folding piece, 9, mounted upon the axle or rake head, substantially as set forth.

4th, The combination with the arms J and p, of lever, H, with one or two forks, m, and one or two arms, 5, under the arrangement and for operation substantially as and for the purposes set forth.

5th, The combination with lever, H, and arms, I and p, of the spring, L, arranged and operating substantially as and for the purposes set forth.

6th, The combination with the axle or rake head of one or more rake teeth, G, attached to the rake head, as described, and provided each with a rear curve from e to d, a front curve from e to c, and a shank, f substantially as and for the purposes herein shown and set forth.

68,284.—CONCRETE AND TILE PAVING.—Cornelius Burlew, Lockhaven, Pa., assignor to himself and Thornton Smith, Washington, D. C.

1st. I claim the mode, substantially as set forth, of compounding and prepairing concrete blocks for paving.

2d, The mode of laying pavements by the use of concrete blocks imbedded and united substantially as set forth.

68,285.—NURSING BOTTLE.—Milo S. Burr, Boston, Mass.

I claim the mouth guard, the tube and nipple connection combined or made of one piece of wood or other material, as set forth.

I also claim the tube and nipple connection, E, provided with the auxiliary shoulder, d, as and for the purpose set forth.

68,286.—WASHING MACHINE.—C. M. Carleton, Forester, Mich.

1st, I claim the combination of the rubber, F, and rollers, C C and d d, and belt, E, with the bars, G I and y, with their set screws and springs, as and for the purpose set forth.

2d, Arrangement of clutch pulley, R, band F, and shaft, W, with its pulley, with the endless belt, E, or its equivalent, and rubber, F, as and for the purpose set forth.

68,287.—MUSICAL SCALE.—William E. Catlin, Wayne Township, Pa.

I claim the construction and use of my transposition teacher, as and for the purpose set forth.

68,288.—HORSE RAKE.—A. W. Coates, Alharice, Ohio.

I claim the toggle, H, constructed as described, whereby the rake teeth are held down, when the arms, d d, are in line, or nearly so, with each other, and lifted by drawing up the handle, e, which raises the inner end of the arms, d d, the weight of the driver assisting, substantially as herein shown and described.

68,289.—SHEEP-SHEARING TABLE.—Charles, J. Corlett, Warren D. Sherman, Nicholas A. Wolfe, and Chas. Huston, Clarkston, Mich.

We claim the combination and arrangement of the revolving wheel, A, the cords, B B, the snap, C, the cord, D, the eye bolts, E F, the hook, E, the hooked lever, H, with the adjustable table, K, all arranged substantially as described and for the purpose designed.

68,290.—CULTIVATOR.—Charles C. Creek, Liberty, Ind.

1st, I claim the provision, in a corn plow or cultivator, of a sifter wheel, D, constructed and attached substantially as and herein described.

2d, I claim the plow irons, B B', having the element, b b' b'', arranged as shown and described.

3d, I claim the arrangement in a corn plow or cultivator of the adjustable bar, G, with its bolt and nuts, F f, substantially as set forth and for the purpose specified.

4th, In combination with the adjusting bar, G F, I claim the adjusting arrangement, W Y, of the tongue on the beam.

5th, I claim the frame, B, consisting of the elements, S s t, in combination with the racks, U U, and chains, V V, admitting of a slight forward or retrograde movement in the plows, B B', in respect to each other and the beam, H.

68,291.—CURING AND PRESERVING GRAIN.—Folsom Dorselt, Chicago, Ill.

1st, I claim a system of ventilating frames, A A, used in stacks of hay, grain, etc., said frames being adjustably closed by doors, B, and arranged to operate substantially as set forth.

2d, The combination of such a system of adjustable ventilating frames and an adjustable sectional roof in stacks, etc., of hay, grain, etc., substantially as set forth.

68,292.—HAMMER FOR BREECH-LOADING FIRE-ARMS.—Wm. H. Elliot, New York city.

1st, I claim, in those arms in which the hammer receives the force of the charge as a breech-plate, and is pivoted to the arm in a rearward direction from the chamber, projecting the lower portion of the face forward, substantially as and for the purpose herein described.

2d, So arranging and constructing the face of such hammer and the firing point and hammer-pivot in relation to each other that the cartridge will be adjusted to its place in the chamber, as herein set forth.

68,293.—CORN ELEVATOR.—Andrew Erkenbrecher, Cincinnati, Ohio.

I claim the arrangement of adjustable carrier, C, having an endless apron, I, and having its driving shaft, D, inclosed within the hollow trunnion, B, which upholds the said carrier, and about which it oscillates, substantially as set forth.

68,294.—APPARATUS FOR DRYING STARCH.—Andrew Erkenbrecher, Cincinnati, Ohio.

1st, I claim the provision, in a starch drying apparatus, of a series of racks, K, formed to run on tracks, F and J, within and without the drying room, and which communicate, by a similar track, upon a truck, H, which occupies a depressed track or railway, J, substantially as set forth.

2d, The arrangement of drying room or rooms, A B, ventilators, C D, steam heating pipes, E, elevated tracks, F and J, depressed track, I, truck, H, and racks, K, for the the purpose set forth.

68,295.—TRIP HAMMER.—Jos. Tandler, Grand Rapids, Mich.

1st, I claim the combination of the hammer, C, with its several parts, with the adjustable spreader, F, substantially as described for the purpose specified.

2d, The adjustable spreader, f, arranged and connected as described.

3d, The griping arrangement, substantially as shown in fig. 3, combined with the hammer, as and for the purposes set forth.

4th, The upsetting wheel, J, and the pulley, e, connected to the frame, A, and operated in the manner described.

68,296.—COTTON SCRAPER.—T. T. Fleming, Memphis, Tenn.

1st, I claim the combination of the blade or share, a, standard, B, bar, D, and plate or shoulder, C, all arranged substantially as and for the purpose set forth.

2d, I further claim the knife, E, applied to the rear of the blade or share, substantially as and for the purpose specified.

68,297.—CORN MARKER FOR PLANTING.—David A. Freeman, Bellville, Mich.

I claim the combination and arrangement of the axle, A, provided with joints, B B, the frame, C, the seat, D, the wheels, E E E E, collars, a a a, and the set screws, g g g and c, and the beveled lugs, H H H, etc., all arranged substantially as described for the purpose designed.

68,298.—MORTISING MACHINE.—D. L. Gibbs (assignor to R. Ball & Co.,) Worcester, Mass.

1st, I claim the combination with the sliding frame, 18, and rod, L, of levers, K' L', and weight, L'', said parts being arranged to operate in relation to each other, substantially as and for the purposes set forth.

2d, The combination with the sliding frame, 18, of the adjustable pieces, M M, slotted cross pieces, N N, adjusting bolts, 23, as and for the purposes set forth.

3d, The combination with the weighted sliding frame and levers and connecting rod for actuating the same, of a spring attached to said connecting rod, under the arrangement and for operation as herein described.

4th, The combination of stand, d, stationary screw, e, gears, a b, shaft, D, with the sliding piece, B, substantially as and for the purpose set forth.

5th, The combination with the sliding plate, B, of the bed, E, carrying the bearing, C, and stay brace, 7, in the manner and for the purpose herein described.

6th, The combination with the table of a mortising machine of the vertical sliding pieces, j, and lever, G, substantially as and for the purposes set forth.

7th, The combination with the table, F, of the vertically sliding pieces, j, provided with projections, k, and screws, m', and the lever, G, or its equivalent and perforated plate or stand, s, under the arrangement and for operation as herein shown and described.

8th, The combination in a machine as described, with the sliding pieces, j, and lever, G, of the stationary screw, m, and adjusting or stop nuts, e e', the whole being arranged and operated as herein specified so that mortises may be cut either in or out of line as desired.

9th, The combination with the catch wheel, H'', provided with beveled recesses of the spring lever, A, and beveled pin, o, arranged for operation in a hub mortising machine, as and for the purposes stated.

10th, The combination with the sliding piece, B, and bed, E, of the lever, I', in the manner herein described, so that the lever will be raised and lowered with the bed, substantially as and for the purpose set forth.

11th, The combination with the bed, E, and the lever, I, of the flat half twisted spring, I''', substantially as and for the purposes set forth.

12th, The combination of slotted stop pieces, Q Q, or their equivalent with slotted piece, K, substantially as and for the purposes set forth.

13th, The combination of the slotted piece, K, and adjustable catch pieces, 2 2, with frame, A, and lever, I', for the purposes set forth.

68,299.—HEATING STOVE.—John Grossius, Cincinnati, Ohio.

I claim the arrangement in a heating stove of the plates, C D E F, apertures, e g, and exit pipe, J, as and for the purpose herein described and illustrated.

68,300.—COVER FOR COOKING STOVE BOILER.—T. F. Hall and George Eckel, Richmond, Ind.

In combination with the cover, A A', we claim the water chamber formed over the plate, A', and constructed with two funnels one, C, opening through the upper chamber into the boiler below the cover, the other, D, opening into the upper chamber and with the induction pipes, E, substantially as and for the purpose set forth.

68,301.—POWER HAMMER.—Martin Hunkley, Rochester, N. Y., assignor to himself and M. R. Ballintine.

1st, I claim the set screw, s, adjustable hammer bar, B, in combination with the straight indented hammer shaft, S, all constructed and arranged as and for the purposes set forth.

2d, In connection with the hammer shaft, S, the arrangement herein described of the convolute spring, C, screw coupling, c, connecting rod, f, and lever, b, as and for the purposes specified.

3d, The arrangement of the adjustable stop, r, and guide plate, n, in connection with the coupling plate, w, as and for the purposes specified.

68,302.—PLAYING CARD BOARD.—Ralph S. Jennings, (assignor to himself and Chas. D. Macqueer, Philadelphia, Pa.

I claim a playing card board constructed in sections as described and having compartments, E, with finger holes therein for taking up the cards and disks and pointers, G G and H H, all arranged and combined substantially as and for the purposes set forth.

68,303.—HARNESS MOTION FOR LOOMS.—L. J. Knowles, Warren, Mass.

I claim the combination with the heddle levers of a loom, the arrangement of disk or plate cams in pairs with respect to each heddle lever and the pins thereof so that both disks may act continuously upon the pins substantially as described.

68,304.—LINE HOLDER.—William Morse, Boston, Mass.

1st, I claim in combination with the piece, a, serpentine or corrugated holding pieces, b d, substantially as and for the purpose set forth.

2d, Also in combination with such holding pieces and with the piece a, a movable device arranged to operate substantially as described.

68,305.—BILL HOLDER.—Gilman Moulton, Cambridge, Mass.

I claim the hinged and spring connection of the two parts or a bill holder cover, substantially as de-cribed.

Also in combination with the two covers, a and b, of a bill holder of pockets and a flap, K, substantially as described.

68,306.—GATE FOR RAILROAD CROSSINGS.—J. Mason and F. M. Wilson, Boston, Mass.

We claim the combination of the rotary gates supporting shafts or sleeves and their pulleys and connecting band or chain with reference to the stantionary posts and relatively to each other the pulleys and their operating mechanism being arranged below the track or road bed and operating together to simultaneously open or close the gates, substantially as set forth.

68,307.—TABLE KNIFE.—Peter Neff, Cincinnati, Ohio.

I claim the combination of the blade, a, and tang, B, cut out of a single piece of steel and having shoulders, a a', the handle, C, having a slot or recess, c, and the slotted bolster, E c, secured upon the tang, B, between the shoulders, a a', and the end of the handle, all as herein described.

68,308.—HITCHING POST FOR ANIMALS.—Daniel Newton, Southington, Ct.

I claim the several parts shown at, A B C D and E, when constructed and arranged as set forth.

68,309.—POTATO DIGGER.—N. S. Noyes, Plymouth, Mich.

1st, I claim the perpendicular motive given to the grating, C, for the purpose described.

2d, The combination and arrangement of the frame, a, seat, B, grating, C, endless belt, D, connecting rod, E, pulley, F, eccentric wheel, H, plow, K, collar, I, shaft, L, driving wheel, M, drum, N, spring, O, wheels, P P, wheel, R, lever, S, ball, J, frame, U, belts, V W, arranged substantially as described for the purpose designed.

68,310.—STEAM PLOW.—H. E Paine, Milwaukie, Wis.

1st, I claim the device for operating a gang plow spader or digger, with or without an accompanying harrow or seeder by means of two stationary engines, located on opposite sides of the section to be plowed and connected by by ropes passing around drums and wound upon and from them in the manner and to the effect set forth.

2d, The construction and combination of the drums, L M L M, actuated by separate engines but connected and co-operating in the manner set forth.

3d, The arrangement and combination with the shaft of the winding drums, L M, and the hoisting drum, N, substantially in the manner and for the purpose set forth.

4th, The arrangement substantially as set forth and described of the gear wheels, J and K, and their shafts so that power to move the engine from place to place may be transmitted to the bearing wheels through the same mechanism which operates the plow.

5th, The derrick, R, with its fall rope, Q, constructed substantially in the manner and for the purpose set forth.

6th, The anchor, J, constructed and operating as set forth and described.

7th, The rectangular gang of plows used to plow without ridging, and constructed and operating as shown and described.

8th, The triangular gang of plows used for ridging, and constructed and operating as shown and described.

68,311.—BARREL WASHING MACHINE.—Jonathan Peacock, Rockford, Ill.

1st, I claim the combination with the reservoir or trough of the discharge valves, the rocking lever and the catch all arranged and operating as described.

2d, The combination with the trough of the pipes, the lifting frame, and the catch, all constructed, arranged, and operating as described.

3d, The combination with the water trough, of the balance valve, P, constructed and arranged as described.

4th, The combination with the clamping rails, c', of the serrated, fixed clamps, G, for holding the barrel at an angle to the plane of rotation as described.

5th, The combination with the clamping rails, c', of the vibrating clamps, h, arranged and operating as described.

6th, The combination, substantially as described, of the holding rails, the vibrating clamps, the slide bars, and the balance lever.

7th, The combination of the latch lever, or detent, t, with the driving shaft, as described.

68,312.—STEAM ENGINE SLIDE VALVE.—E. J. Piper, and J. C. Marshall, Springfield, Mass.

I claim, in combination with the valve, B, the gib, a, arranged substantially as described, and adjustable from the outside of the valve, as herein set forth.

68,313.—PLOW.—Burdet C. Rouse, Morris, Ill.

I claim the rotary landside cutter, in combination with the shear bar at its point, and arranged in the manner and for the purpose above set forth.

68,314.—MECHANICAL POWER APPLIED TO SEWING MACHINES.—L. W. Sapp, M.D., Cleveland, Ohio.

I claim the driving mechanism provided with controlling and regulating devices, constructed, arranged and combined with a sewing machine, substantially as and for the purpose set forth.

68,315.—RAILWAY SWITCH.—W. F. Serjeant, St. Louis, Mo.

1st, I claim a double locking automatic railroad switch, which is constructed in the manner and upon the principles substantially as herein set forth.

2d, The longitudinal levers, D D, arranged on both sides of the track, and extended alongside of the siding or turn out, said levers being provided with segment levers, H, and constructed so as to be acted upon by keys, G2, upon a moving train, and caused to change the switch at the pleasure of the engineer, substantially as described.

3d, The expansible keys, G2, constructed substantially as and for the purposes described.

4th, The anti-friction roller, f', applied to the key, G2, substantially as and for the purpose described.

5th, The combination of segment levers, H, the switch levers, D D, and the connection of such segment levers, with locking devices, so that the switch rails shall be automatically locked and unlocked, as well as changed from right to left, by means substantially as described.

6th, The locking levers, N N, applied to a rock shaft, K', and connected by means of chains and rods with devices applied to the switch rail levers, substantially as described.

68,316.—APPARATUS FOR COOLING MILK.—C. L. Sheldon, Lowville, N. Y.

I claim the use of a water receiver, a d, so constructed that it shall receive the water at one extremity, and, when wholly or partly filled, empty its contents at its opposite extremity, and in this act of descent and discharging impart motion to the plunger, k, also the use of the plunger, k, when the same is used as an attachment for agitating milk in cheese vats.

68,317.—CLOTHES DRYER.—G. P. Sisson, Florence, Mass.

I claim a clothes' drying reel, in which the arms are operated by means of a screw arranged in the center.

68,318.—GAS HEATING APPARATUS FOR SAD IRONS.—Jacob D. Spang, Dayton, Ohio.

1st, I claim the burners, C, having the slits, c c, and the central button, x, combined and arranged together, substantially as and for the purpose described.

2d, The screen, D, having clusters of apertures, d d d, as and for the purpose described.

3d, The arrangement and combination of the burner, C, screen, D, and chamber, E, having the heating compartments, e e e, substantially as and for the purpose specified.

68,319.—FRUIT JAR.—C. F. Spencer, Rochester, N. Y.

I claim a ready-formed cover or stopper for fruit, jelly and other jars or cans made of paper, cloth or other easy penetrable material prepared so as to be air-tight and having its surface provided with gum or other adhesive substance so as to be self-attaching, self-sealing, and self-retaining, substantially as and for the purpose herein specified.

68,320.—SHEEP RACK.—David Stapleton, Iowa City, Iowa.

1st, I claim the loose rack, G H I, and its bearings, b and c, in a sheep rack, substantially as and for the purpose described.

2d, The sheep rack, constructed with the loose rack, the vertical pieces, I, of which fit between its vertical pieces or boards, D, substantially in the manner and for the purposes described.

68,321.—PRODUCTION AND MANUFACTURE OF CARBONIC ACID AND IN THE APPLICATION OF THE SAME FOR VARIOUS USEFUL PURPOSES.—Simon Stevens, New York City.

1st, I claim the process of preparing carbonic acid herein described.

2d, The use of carbonic acid prepared in the manner herein described for the improvement of the several processes and manufactures herein specified.

3d, The compound formed by mixing hydro-carbon spray with air or air and steam for producing motive power in gas and other engines, substantially as herein set forth.

68,322.—CONSTRUCTION OF BARRELS.—George St. George, New York City.

I claim constructing a barrel with raised surfaces made on the head or heads or other suitable part thereof, substantially as and for the purpose herein set forth.

68,323.—TRACE ATTACHMENT.—Andrew Thompson, Ottumwa, Wis.

I claim a metal harness trace point, B, having ratchet teeth, b b, or their equivalents, in combination with a spring clamp, d, for fastening the trace, constructed, arranged, and operating substantially as and for the purpose herein described.

68,324.—WATCH REGULATOR.—W. B. Tucker, Hillsboro, O.

I claim operating the regulator of a watch or other time keeper by means

of an attachment thereto composed of the scale base plate, a, supporting knobe, b b', horizontal screw shaft, b, toothed wheels, d and e, winding arbor, f, and the attaching and indicating nut, g, all arranged and operating substantially in the manner herein set forth.

68,325.—WATER WHEEL.—Thomas Welham, Philadelphia, Pa.

1st, I claim the friction water wheel, constructed as shown and inclosed in a case, as herein described.

2d, I also claim the flanges, A, of the water-tight casing, B, said flanges forming a passage entirely around the circumference of the wheel, C, as herein shown and described.

68,326.—MUSKETO BAR AND WINDOW SCREEN.—Alcibiades J. Whittier, Roxbury, Mass.

I claim the hook, d, and the bolts, a, or their equivalent, when applied and arranged for operation substantially as and for the purpose set forth.

68,327.—CAR PLATFORM.—H. S. Wilcox, West Meriden, Ct.

I claim the car platform constructed with plates, a a', railing, f f', supported by the posts, e e, and secured to the cars by bolts or screws, all constructed and arranged substantially as described and for the purpose set forth.

68,328.—REFINING SUGAR AND SIRUPS.—Henry A. Williams (assignor to himself and Benj. H. Chadbourne), St. Louis, Mo.

I claim a combination of the ingredients used in preparing said compound, in about the proportions herein named and for the purposes set forth.

68,329.—CORN COVERER.—A. J. Combs, Olney, Ill.

I claim the combination of the frames, A and E, handles, C, roller, F, and shovels, B, all arranged and operating in the manner and for the purposes set forth.

68,330.—MANUFACTURE OF BOOTS AND SHOES.—Wm. Duchemin and Albert Jeffers, Lynn, Mass.

We claim the peculiar construction of the tool for forming the above mentioned channel and turning its edges, consisting of the bar, A, formed at its lower end into the cutter, A, the beak or plowshare, b, and the mold board or boards, c, substantially in manner and to operate as specified.

68,331.—SHEET COPPER PLATES FOR CULINARY VESSELS.—Andrew O'Neill, Portsmouth, O.

I claim as a new article of manufacture a sheet of copper tinned, varnished, and cold rolled, in the manner set forth.

68,332.—ILLUMINATING ROOFS AND ROOF PAVEMENTS.—Thaddeus Hyatt (assignor to Elizabeth Adelaide Lake), New York city.

I claim, 1st, Forming the approaches over an areaway to the doorways of a building from the sidewalk by means of a solid translucent bridging of iron and glass, which serves the double purpose of stoop and roof, substantially as herein described.

2d, Uniting the "areaway" to the basement of a building by a water-tight roof of iron and glass so combined as to form a generally flush surface fit for walking upon and laid in the plane of the sidewalk, substantially as described.

3d, Uniting the basement of a building to the space under the street by means of a translucent water-tight roofed airy way when the glass and iron which compose the roof are so combined as to form a generally flush surface fit for walking upon and are laid in or nearly in the plane of the sidewalk, substantially as herein set forth.

4th, Combining an area light with the sidewalk and a building by means of a double cemented joint made with putty, or its equivalent, and fusible cement, substantially as herein set forth.

5th, Combining the glass of a roof light with the iron framing of the same by means of a double cemented joint, substantially as herein described.

6th, I claim broadly as my invention an illuminating roof of iron and glass where the iron which supports the glasses in position forms the general strength of the roof, the combination being such as to secure the two-fold object of equalizing and distributing the strength of the iron while distributing and equalizing the light of the glasses.

7th, I also claim broadly as my invention an illuminating step roof, composed of glass and iron that is to say where the iron and glass are composed into illuminating sills and illuminating risers, and these are again combined to form an illuminating roof, substantially in the manner and for the purposes herein set forth.

68,333.—VAGINAL SYRINGE.—A. W. Washburn, Yazoo City, Miss.

I claim the enlargement of the immediate entering head of a syringe to such an extent as to produce an annular flange radiating the desired distance beyond the barrel or conducting tube of the same and thereby producing the improved vagina syringe herein represented and described or any other which shall be substantially the same.

REISSUES.

2,753.—GOVERNOR FOR STEAM ENGINES.—Augustus Brown, N. Y. City. Patented Nov. 7th, 1865.

I claim, the swivel arm, C, subjected to the action of a spring or weight in combination with the throttle or governor valve of a steam engine and with the belt which serves to impart motion to the governor, substantially as and for the purpose described.

2,754.—VALVE GEAR FOR STEAM ENGINE.—Putnam Machine Company, Fitchburgh, N. Y. Assignees of Charles H. Brown and Charles Burleigh. Patented January 15, 1856.

1st, We claim the cam shaft, S, when so arranged with reference to the main shaft, E, of the engine as to revolve at a rate of speed less than that of the said main shaft of the engine, substantially as, and for the purpose described.

2d, We claim the described arrangement of two or more cams, h, upon the shaft, S, and with reference to the induction valves substantially as and for the purpose described.

3d, The shoulder and levers, d, having adjustable fulcrums, e, in combination with a cam or cams, h, for operating the valves and varying the point of cut-off substantially as set forth.

4th, Arranging the governor with reference to the shouldered levers, d, so that it will control the position of their fulcrum, e, and thereby regulate the velocity of the engine substantially as described.

5th, The manner of arranging the steam and exhaust valves with relation to the cylinder, H, and shaft, S, as and for the purpose set forth.

2,755.—HARVESTER.—Robert Bryson, Schenectady, N. Y. Patented April 8, 1862.

1st, I claim a main frame of a harvester which is adapted for carrying the drivers seat and the gearing that operates the cutters and also for having the draft tongue attached to it, said frame being carried by two driving and supporting wheels both of which are furnished with a ratchet and pawl having a finger bar, carrying a platform, hinged to it, at one side thereof, in combination with a circularly moving sweep rake which is sustained by the hinged connection of the finger bar and platform and moves over the platform at intervals and discharges the cut crop at one side thereof, in rear of the driving wheels, such rake being driven automatically from the draft frame.

2d, A fulcrum or pivot for a circularly moving sweep rake, a guide for such rake and a finger beam carrying a platform, all so connected to each other and hinged to the draft frame at one side thereof that while the rake has no other support upon the draft frame than is derived from the hinge connection of the finger beam, and is driven automatically from the draft frame, it with its pivot and guide will work in unison with the platform and finger beam through all the vibrations of the same without affecting the draft frame or changing the angle of the pivot or fulcrum with the platform.

3d, Arranging the crank or its equivalent which communicates motion to a rake which is on a hinged platform nearly in line with the joint of the finger bar, so that the movements of this finger bar will not cause the joint to bind, nor materially affect the motion of the crank which works the rake.

4th, In harvester with a two wheel draft frame, a finger bar carrying a platform and a rake, the finger bar platform and rake being connected to each other and hinged to the draft frame at one side thereof, I claim communicating motion to said rake from the main axle when the latter is connected to both driving wheels by pawls and ratchets.

5th, The combination of a finger beam carrying a platform and a circularly moving sweep rake, an inner and outer supporting wheel for the finger beam, platform and rake, a hinge connection which is parallel or nearly so to the line of draft for the finger beam and platform, and a two wheel draft frame.

6th, A sweep rake mounted upon a platform connected to a finger beam which is hinged to the inner side of the draft frame in such manner that the inner edge of the platform does not extend beyond the said inner side of the draft frame.

7th, A sweep rake, a platform and a finger beam, connected together and hinged to the draft frame by means of a hinge connection which allows both the outer and inner ends of the finger beam and platform to accommodate themselves to the undulations of the ground, so that the rake is allowed unchangingly to follow the motions of the platform and cutting apparatus or finger beam.

8th, A sweep rake mounted on a hinged platform and driven from the main frame, the pivot of said rake being between the center of the draft frame, and the outer divider of the platform, and the platform upon which the grain falls terminating near the inner side of the draft frame.

2,756.—SHADE FIXTURE.—Stewart Hartshorn, New York City. Patented Oct. 11, 1864.

I claim the application to a shade roller provided with a spiral spring for automatically raising or rolling up the shade of a pawl and a ratchet, or notched hub, so arranged that the former will engage with the latter at any point or height of the shade by simply checking the rotation of the roller and the upward movement of the shade under the influence of the spring, substantially as set forth.

2,757.—SOFA BEDSTEAD.—Charles F. Martine, Boston, Mass. Patented June 6, 1854. Reissued Dec. 25, 1855.

1st, I claim the single spring mattress so constructed and arranged with a sofa having a hinged back as to form, when the back is dropped from an upright to a horizontal position for forming a bed, an even surface without joint or center depression substantially as and for the purpose specified.

2d, So constructing and arranging the single spring mattress with a sofa having a hinged back that when the back is raised from a horizontal to an upright position for forming a sofa, said mattress shall be drawn in or depressed longitudinally at or near its center by means of cords or their equivalents and will have the appearance and effect of two separate cushions one for the seat and the other for the back of the sofa, substantially as specified.

3d, The arms separated in the center when used in combination with the sofa and mattress constructed in the manner and for the purpose described.

DESIGNS.

2,768.—SPOON.—Charles T. Marchand, Deleware City, Del., assignor to Higgins, Marchand & Co., Philadelphia, Pa.

2,769.—STATUETTE.—J. S. McKaye and H. G. McKay, New York City.

2,770.—CARPET OR OIL CLOTH PATTERN.—Charles T. Meyer, Bergen, N. J., assignor to Edward C. Sampson, New York City.

2,771.—TRADE MARK.—H. J. and J. T. Monsch, Louisville, Ky.

3,772.—FORK OR SPOON HANDLE.—John Polhamus, New York City.

2,773.—FENCE.—W. E. Smith, Hartleton, Pa.

2,774.—TRADE MARK.—William Ziock, St. Louis, Mo.

PENDING APPLICATIONS FOR REISSUES.

Application has been made to the Commissioner of Patents for the Reissue of the following Patents, with new claims as subjoined. Parties who desire to oppose the grant of any of these reissues should immediately address MUNN & Co., *37 Park Row, N. Y.*

26,527.—WORKING BUTTER.—J. P. Corbin, Whitney's Point, assignee by mesne assignment of Josiah Seymour. Dated Dec. 20, 1859.

Application for reissue received and filed Dec 22 1866.

1st, A vibrating rod, F, handle, G, and butter worker, H, combined and arranged to operate as shown, or in an equivalent manner, for the purpose set forth.

2d, The combination of the tray, B, with the butter working apparatus, arranged for joint operation, substantially as shown and described.

3d, The manner of tipping the tray or bowl to drain off the fluids, also of securing it to the table or frame, for the purpose set forth.

65,003.—STEAM ENGINE.—Horatio C. Perry, and John L. Lay, Buffalo, N. Y. Dated May 21, 1867. Application for reissue received and filed Aug. 19, 1867.

The combination and arrangement of the high and low pressure cylinders, A and B, of a vertical compound engine, having a continuous piston rod, with a space or chamber intervening between their proximate heads, substantially as and for the purpose set forth.

The comb nation and arrangement of the shelf or frame constituting the intervening chamber, K, with the two cylinders, A and B, and continuous piston rod, F, its bottom plate forming the cover of the cylinder, B, constructed substantially as and for the purposes herein set forth.

We also claim the jetuming box, consisting of the sleeve, h, and packing box L, in combination with the chamber, K, and piston, F, and cylinders, A B, arranged and operating substantially as and for the purposes set forth.

We further claim the combination and arrangement of the man-hole, I, with the bottom plate of chamber, K, forming the head of the cylinder, B, whereby the adjustable ring, M, and sectional pack rings, r s, of the piston, E, may be removed, substantially in the manner and for the purposes herein set forth.

47,647.—WALL BUILDER AND STUMP EXTRACTOR.—George W. Packer, Jr., Mystic River, Ct. Dated Aug. 29, 1865. Application for reissue received and filed, Aug. 21, 1867.

1st, I claim the within-described mode of laying masses in a wall or equivalent work, that is to say, partially turning the vehicle so as to bring the mass over the point desired, without moving the wheels across the same substantially as herein specified.

2d, I claim the within-described combination and arrangement of the pyramidal frame, M M1, M2, and curved reaches, E1 E2, with the four wheels and their accessories, substantially as and for the purposes set forth.

3d, I claim the employment of braces, P1 P2, or their equivalents, in combination with the struts, M, etc., and the curved reaches, P, etc., and arranged to be supported on wheels, substantially in the manner described, so that the braces shall aid in maintaining the curvature, or arching condition of the reaches, by connecting each to the struts above, at one or more points, as and for the purpose herein set forth.

4th, I claim the spherical based rocker, C, having the king bolt, D, connected thereto by a loose joint, as represented, in combination with a trussed frame, M, etc., and with the wheels, substantially as and for the purposes herein set forth.

☞ NOTE.—*The above claims for Reissue are now pending before the Patent Office and will not be officially passed upon until the expiration of 30 days from the date of filing the application. All persons who desire to oppose the grant of any of these claims should make immediate application to* MUNN & CO., *Solicitors of Patents, 37 Park Row, N. Y.*

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

924.—AIR ENGINE.—Philander Shaw, Boston, Mass. March 29, 1867.

2,116.—HEATING AND COOKING APPARATUS.—Oscar F. Morrill, Chelsea, Mass. July 18, 1867.

2,137.—BREWING, AND APPARATUS EMPLOYED THEREIN.—Wm. S. Haight, Waterford, N. Y. July 22, 1867.

2,140.—NETS AND NETTING.—Benj. Arnold, East Greenwich, R. I., and Wm. J. Hooper, Baltimore, Md. July 23, 1867.

2,145.—SPRING RED BOTTOM.—Sterling Bonsall, Philadelphia, Pa. July 23, 1867.

2,146.—TANNING, AND APPARATUS EMPLOYED THEREIN.—Sterling Bonsall, Philadelphia, Pa. July 23, 1867.

2,155.—RECIPROCATING MOTION.—John B. Page, New York city. July 24, 1867.

2,160.—MOLD BOARD FOR PLOWS.—Leman P. Rider. Munson, O. July 25, 1867.

2,178.—MODE OF CONSTRUCTING AND PROPELLING STEAM VESSELS.—Stephen J. Gold, Cornwall, Conn., and Henry J. Weston, Brooklyn, N. Y. July 27, 1867.

2,179.—WATER AND GAS METER.—Joshua Mason, Paterson, N. J. July 27, 1867.

2,191.—MACHINERY FOR HULLING RICE, ETC.—Simon G. Cheever, Boston, Mass July 29, 1867.

2,192.—INSULATORS FOR TELEGRAPHIC WIRES.—David Brooks, Philadelphia, Pa. July 29, 1867.

2,214.—MACHINE FOR MANUFACTURING WEAVERS' HARNESS.—Joseph S. Winsor and Wm. W. Fletcher, Providence, R. I. July 31, 1867.

2,226.—POCKET KNIFE.—L. S. Morris, Hopkinsville, Ky. Aug. 1, 1867.

2,227.—BREECH-LOADING FIRE-ARM.—Theodore Yates, Milwaukee, Wis. Aug. 1, 1867.

EXTENSION NOTICES.

Joseph Goldmark, of Brooklyn, N. Y., having petitioned for the extension of a patent granted to him the 22d day of November, 1853, for an improvement in facing ends of percussion caps, for seven years from the expiration of said patent, which takes place on the 22d day of November, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 4th day of November next.

Charles J. Woolson, of Cleveland, Ohio, having petitioned for the extension of a patent granted to him on the 4th day of December, 1860, for an improvement in design for stove plate, for seven years from the expiration of said patent, which takes place on the 4th day of December, 1867, it is ordered that the said petition be heard at the Patent Office on Monday, the 18th day of November next.

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The intersection and development of surfaces, with applications:—The intersection of cylinders and cones, plate XIV. The delineation and development of helices, screws, and serpentines, plate XV. Application of the helix—the construction of a staircase, plate XVI. The intersection of surfaces—applications to stopcocks, plate XVII. Rules and practical data—steam, unity of heat, heating surface, calculation of the dimensions of boilers, dimensions of fire grates, chimneys, safety valves.

The study and construction of toothed gear:—Involute, cycloid, and epicycloid, plates XVIII. and XIX. Involute, Fig. 1, plate XVIII. Cycloid, Fig. 2, plate XVIII. External epicycloid, described by a circle rolling about a fixed circle, inside it, Fig. 3, plate XIX. Internal epicycloid, Fig. 2, plate XIX. Delineation of a rack and pinion in gear, Fig. 4, plate XVIII. Gearing of a worm, with a worm wheel, Figs. 5 and 6, plate XVIII. Cylindrical or spur gearing, plate XIX. Practical delineation of a couple of spur wheels, plate XX. The delineation and construction of wooden patterns for toothed wheels, plate XXI. Rules and practical data—toothed gearing, angular and circumferential velocity of wheels, dimensions of gearing, thickness of the teeth, pitch of the teeth, dimensions of the web, number and dimensions of the arms, wooden patterns.

Continuation of the study of toothed gear:—Design for a pair of bevel wheels in gear, plate XXII. Construction of wooden patterns for a pair of bevel wheels, plate XXIII. Involute and helical teeth, plate XXIV. Contrivances for obtaining differential movements—the delineation of eccentrics and cams, plate XXV. Rules and practical data—mechanical work of effect, the simple machines, center of gravity, on estimating the power of prime movers, calculation for the brake, the fall of bodies, momentum, central forces.

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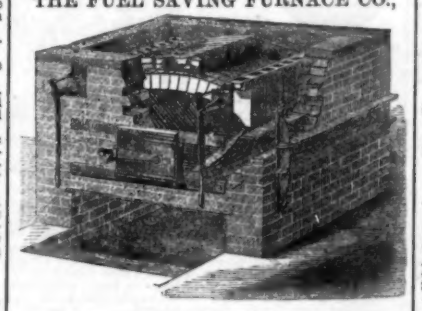

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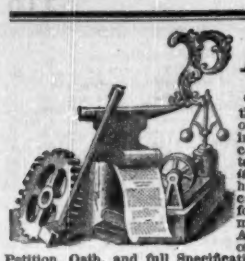

PATENTS

The First Inquiry that presents itself to one who has made any improvement or discovery is: "Can I obtain a Patent?" A *positive* answer can only be had by presenting a complete application for a Patent to the Commissioner of Patents. An application consists of a Model, Drawings, Petition, Oath, and full Specification. Various official rules and formalities must also be observed. The efforts of the inventor to do all this business himself are generally without success. After a season of great perplexity and delay, he is usually glad to seek the aid of persons experienced in patent business, and have all the work done over again. The best plan is to solicit proper advice at the beginning.

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